NDALL COUNTY SOILS

SOIL REPORT 75

UNIVERSITY OF ILLINOIS
AGRICULTURAL EXPERIMENT STATION

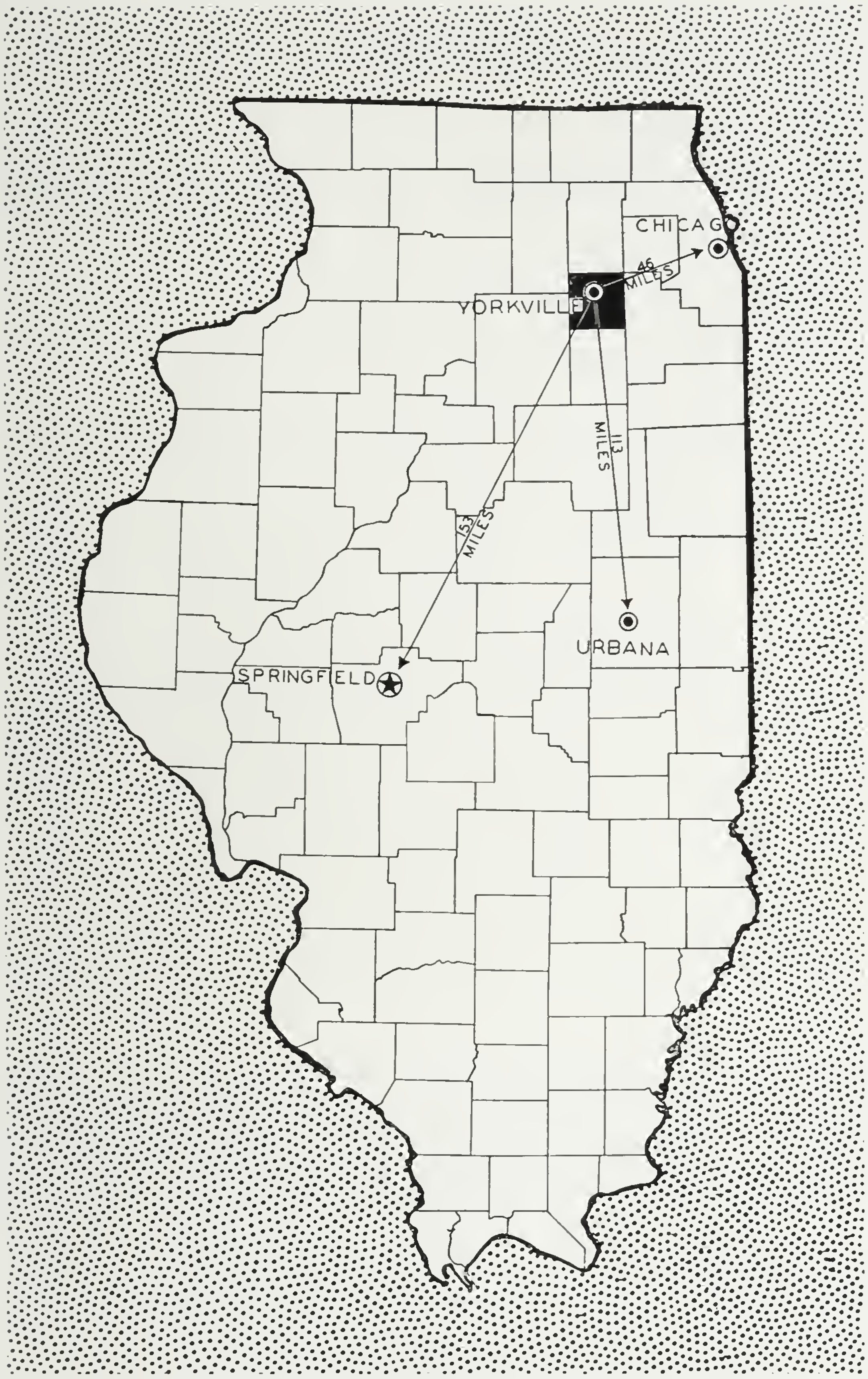
COVER PICTURE

The picture on the cover of this report shows how a part of Kendall county appears from the air. Across the lower half of the picture Fox river, with its numerous islands, divides Yorkville on the south from Bristol. Blackberry creek winds down from the north. From the southeast below Yorkville Route 126 joins Route 47. North of Bristol Route 47 crosses Route 30. In the center of the photograph the State Game Farm and Elmwood cemetery can be identified.

The spotted appearance of the soils north of Fox river is due to small depressions containing dark soils such as Troxel and Knight. Most of these spots are too small to be shown on a small-scale soil map. The larger dark area lying to the northwest on both sides of Route 30 is Drummer clay loam. The lightest areas along Blackberry creek are Vance silt loam.

South of Fox river the dark soils are mostly Drummer and Saybrook, and the light-colored soils are mainly Miami.

(Picture supplied by
Production and Marketing Administration,
U. S. Department of Agriculture)



Kendall county lies in northeastern Illinois. Yorkville, the county seat, is about 46 miles southwest of Chicago and 113 miles north of Champaign-Urbana, where the University of Illinois is located.

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The authors are indebted to other members of the staff for the following photographs: to W. F. Purnell for Figs. 1, 4, 6, and 8; and to B. F. Muirheid for Fig. 7.

Urbana, Illinois March, 1952

KENDALL COUNTY SOILS

By Herman L. Wascher and R. T. Odell

THIS SOIL REPORT has been prepared primarily for the farmers of Kendall county. The soil map in two sections shows the soils that occur in this county. Suggestions are made in the text for the use, conservation, and management of each kind of soil shown on the map.

This report attempts to answer four questions for the farmers and landowners of Kendall county: *What soil types do I have on my farm? What treatment does each soil type need? What crops are adapted to each soil type? What yields may be expected on each soil type?*

Kendall county is mainly agricultural. In 1950, 95 percent of the county was in cultivated crops and pasture. An average of more than 13 head of cattle and 43 hogs were fed on each farm.

A large portion of Kendall county land is nearly level and of good quality. The principal areas of rolling land are on the Marseilles moraine, lying south of and approximately parallel to Fox river, and the Minooka moraine, lying along the east border of the county.

Scenes like this are common in Kendall county. This view looks southeast across the large muck area drained by Morgans creek dredge. The rolling area in the background is made up mainly of Miami silt loam, rolling phase, and Strawn silt loam. Fig. 1

HOW TO KNOW YOUR SOILS AND PLAN THEIR MANAGEMENT

First Examine the Soil Map

Note names of soil types. The first step in using this report is to turn to the soil map and note the names of the soil types in the area in which you are interested. The map, consisting of two sheets, shows the location and boundaries of the various soil types in the county. The area of each type is shown not only by a distinguishing color but also by a number usually placed in each area. Where an area is too small to accommodate the soil number, the number is placed adjacent to the area and connected with it by a line.

Colors are guide to general soil conditions. One of the most important characteristics of the soils in Kendall county is the permeability of the subsoils and underlying materials to both water and plant roots. Five degrees of permeability have been recognized in those soils that are underlain by glacial till. On the soil map, different colors are used to indicate the various degrees. Shades of *blue,* as shown in the central part of the county, are used for soils that are moderately permeable to both water and plant roots. Drainage is needed on nearly level areas and tile draw well. Shades of *brown,* as shown in the vicinity of the town of Plano, indicate soils that are moderate to moderately rapid in permeability to water. Tile drainage is seldom needed even on the nearly level areas of these soils.

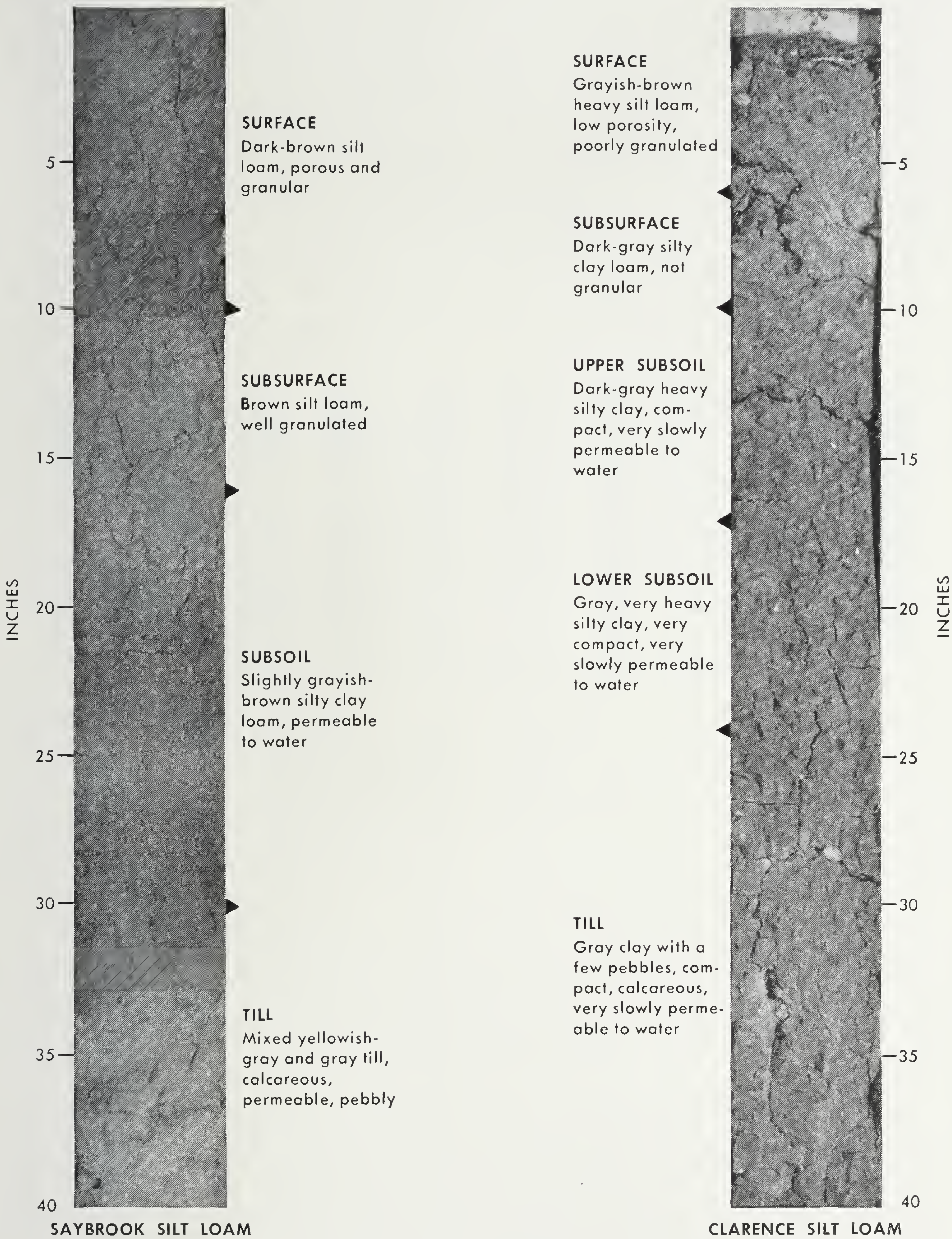
Combinations of *green* and *brown,* as shown on the Minooka ridge along the eastern edge of the county, are used for soils that are moderately slowly permeable. Drainage is needed on the nearly level areas of these soils. Tile draw slowly because the materials beneath the surface layer are rather heavy and compact and therefore the movement of water through them is slow.

Shades of *pink,* as shown in the southeastern part of the county, are used for soils in which tile draw so slowly as to be of questionable value; and shades of *lavender* in the same area indicate soils in which tile are mostly not effective.

Most of the light-colored soils that developed under forest vegetation are indicated by various shades of *yellow.* Many of the dark soils that were derived from outwash are indicated by shades of *green.* Since other colors are often interspersed with the greens, the color patterns for these outwash soils are not as distinct as those for the dark soils derived from till. Green colors are also used to indicate soils that have limestone bedrock at shallow depths.

Study your soil types. After finding out what soil types occur on the farm or tract of land in which you are interested, turn to the soil-type descriptions (see pages 15 to 50) and read what is said about each of the soils on the tract. Some of the soils in Kendall county are hard to manage and are medium to low in productivity; others are easily handled and high in productivity and will retain their high-producing capacity if the well-known good farming practices, including the use of limestone, fertilizers, and organic matter, are followed. The *use-and-management* discussion for each soil type, pages 15 to 50, and Table 7, page 53, bring out these differences in soils and suggest possible solutions for many problems.

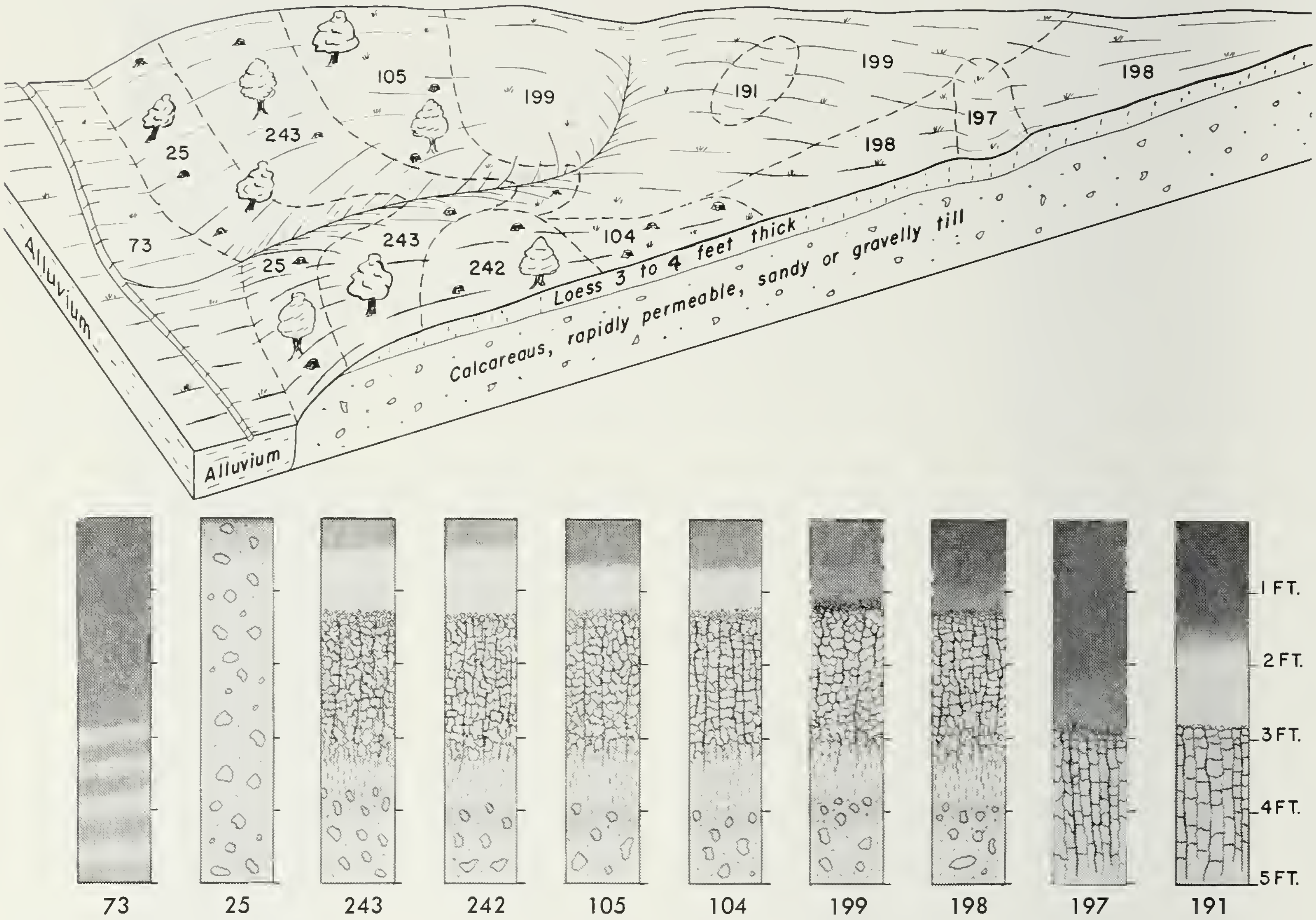
Entire soil profile is important. In studying soil types it is important to keep in mind that soils are separated into types on the basis of the character of the soil



PROFILES OF TWO SOILS SHOWING CONTRAST IN STRUCTURE

Saybrook silt loam is high in organic matter and very productive. Note dark surface horizon, granular structure, and absence of large shrinkage cracks. Because it is more permeable to water, Saybrook does not erode so rapidly as Clarence.

Clarence silt loam is only moderately productive. Note shallow, grayish surface layer, the compact structure throughout the profile, and the large shrinkage cracks indicating high clay content. Clarence erodes easily and is drouthy. Fig. 2



Type No.	Type name	Percent slope	Type No.	Type name	Percent slope
73	Huntsville loam, bottom	0-0.5	**104**	Virgil silt loam	0-1
25	Hennepin gravelly loam	Over 15	**199**	Plano silt loam	1-4
243	St. Charles silt loam	1-4	**198**	Elburn silt loam	0-1
242	Kendall silt loam	0-1	**197**	Troxel silt loam	0-0.5
105	Batavia silt loam	1-4	**191**	Knight silt loam	0-0.5

EFFECT OF TOPOGRAPHY AND NATIVE VEGETATION ON SOIL

The upper part of the above diagram shows how one bottomland soil (*left:* 73), three forest soils (25, 243, and 242), two prairie-forest transition soils (105 and 104) and four prairie soils (199, 198, 197, and 191) are located with reference to topography, or lay of the land. Tufts of grass indicate areas originally covered by grasses and other prairie plants. Trees and tree stumps indicate where timber is now growing or was growing when white settlers entered the region.

The general nature of the different layers of each type is shown in the bottom part of the diagram. These soils differ in the amount of organic matter in their surface horizons, as shown by the dark shading at the top of the panels — the darker the shading the greater the amount of organic matter. They differ also in the amount of clay in the subsoil — the more distinct and blocky the markings in the middle or lower part of a panel, the greater the amount of clay in that soil. These differences in profile development are the result of variations in topography, in depth of the water table, and in the kind of vegetation that was native to the area.

Huntsville, the bottomland soil, has not been in place long enough to have developed a profile. Its color and texture are about the same as when the material was laid down. Fig. 3

to a depth of 40 inches or more, *not on the surface alone*. The surface layer of one type is frequently little or no different from that of another, and yet the two types may differ widely in agricultural value because of differences in the subsurface or subsoil. It is of utmost importance, therefore, in studying descriptions of soil types, to get a clear mental picture of *all* the outstanding features of each type, including the various layers down to a depth of 40 inches or more.

The appearance of two contrasting soils, Saybrook silt loam and Clarence silt loam, to a depth of 40 inches, is shown in Fig. 2. These two photographs show some of the differences between these two soils that strongly affect their agricultural value. In Saybrook, for example, the subsoil and underlying glacial till are permeable to water and roots, making this a productive soil, on which erosion is easily controlled. In Clarence the subsoil and the underlying material are highly plastic, compact, and very slowly permeable. These conditions limit the productivity of this soil and make it subject to destruction by erosion.

Variations occur within each type. It is also important to understand that every soil includes a range in properties. The boundaries between soil types vary in sharpness. Between most soils there is a zone that includes some of the properties of each type. Also, within a given type there often are distinct areas of other types too small to be shown on the soil map.

Compare Your Yields With Test Yields

Use five-year averages. High crop yields year after year are possible only with both good soil and good management. Low yields may be caused by a poor soil, or by trying to grow crops that are not adapted to the soil, or by other faulty management.

Table 1 on page 8 shows what yields can reasonably be expected from Kendall county soils, as an average, over a period of years under a moderately high level of soil management.[1] If you find that your average yields for five years or longer are much below those shown in Table 1 for your soil types, it will pay you to examine your management practices to see where changes should be made. At least five years are necessary for a valid comparison because of the wide seasonal variations that occur in rainfall, temperature, wind, and insect and disease injury.

Still higher yields are possible. On most soils crop yields can be advanced beyond those shown in Table 1 by applying additional fertilizer containing nitrogen, phosphate, or potash, or perhaps the minor elements. Superphosphate drilled with wheat and certain other small grains will, in many seasons, produce profitable increases in yield. There is also evidence that mixed fertilizers applied at corn-planting time often will increase corn yields, especially on very productive soils. Thus while yields below those shown in Table 1 probably indicate faulty management, higher yields are not out of the question.

Since new crop varieties, new cultural and fertilizer practices, and new plant diseases and insect pests may change yield levels in future years, the figures

[1] Anyone interested in land as an investment should realize that crop yields alone are not necessarily a true index to land values, for the operating costs necessary to get good yields vary from one soil type to another. In general, the poorer the soils the more difficult and more costly it is to apply good management practices.

Table 1. — AVERAGE YIELDS OF CROPS

To Be Expected on Kendall County Soils Over a Period of Years Under a Moderately High Level of Management

The practices included in a *moderately high level of management* are discussed on pages 9 to 13. Figures in **bold face** are based upon long-time records kept by farmers in cooperation with the Department of Agricultural Economics; the others are estimated yields. *These yields were obtained without the use of soluble fertilizers.*

Type No.	Type name	Hybrid corn	Soy-beans	Oats	Winter wheat	Alfalfa	Mixed pasture[a]
		bu.	*bu.*	*bu.*	*bu.*	*tons*	*days*
23	Blount silt loam	49(E)[b]	21(E)	38	21	2.2	105
24	Miami silt loam	57(E)	23(E)	43	23	2.6	125
25	Hennepin gravelly loam	N	N	N	N	1.5(E)	80
27	Miami silt loam, rolling phase	50(E)	20(E)	40	21	2.4	110
57	Herbert silt loam, rolling phase	56(E)	22(E)	43	22	2.6	115
59	Lisbon silt loam	**72**	**28**	**52**	**26**	**3.0**	145
60	LaRose silt loam	55(E)	N	41(E)	21(E)	2.4	120
62	Herbert silt loam	63	24	48	24	2.8	130
67	Harpster clay loam	**65**	**25**	**44**	**21**	N	120
73	Huntsville loam, bottom	D	D	D	D	D	D
82	Millington loam, bottom	D	D	D	D	D	D
88	Hagener loamy sand	**40**	14	30	**15**	1.5	85
91	Swygert silt loam to silty clay loam	**55**	**22**	**42**	**22**	2.3	115
96	Swygert silt loam, rolling phase	42(E)	18(E)	35(E)	19(E)	2.0	90
99	Vance silt loam, rolling phase	N	N	37(E)	20(E)	2.2	95
103	Muck	V	V	N	N	N	V
104	Virgil silt loam	62	24	45	24	2.6	125
105	Batavia silt loam	60	23	45	23	2.6	125
145	Saybrook silt loam	**69**	**26**	**53**	**26**	**3.0**	145
146	Elliott silt loam	**62**	**24**	**48**	**24**	**2.7**	130
147	Clarence silt loam	**47**	**20**	**37**	**20**	**2.2**	100
148	Proctor silt loam	**64**	**25**	**48**	**24**	**2.8**	135
149	Brenton silt loam	**71**	**27**	**53**	**26**	**3.0**	145
151	Ridgeville fine sandy loam	**57**	**22**	44	23	2.4	115
152	Drummer clay loam	**70**	**28**	**49**	**25**	**2.8**	130
154	Flanagan silt loam	**71**	**27**	**53**	**26**	**3.1**	145
155	Proctor silt loam, rolling phase	N	N	34(E)	20(E)	2.1	100
158	Vance silt loam	55	22	40	23	2.4	115
171	Catlin silt loam	**64**(E)	**24**(E)	**46**	**24**	**2.9**	135
191	Knight silt loam	55	23	40	21	1.9	100
193	Elliott silt loam, rolling phase	52(E)	21(E)	41	22	2.4	115
194	Blount silt loam, rolling phase	40(E)	18(E)	35(E)	18(E)	2.0	95
197	Troxel silt loam	68	25	47	24	2.6	130
198	Elburn silt loam	69	26	51	25	2.9	140
199	Plano silt loam	66	24	50	24	2.9	140
206	Thorp silt loam	**56**	24	**41**	22	2.0	105
208	Sexton silt loam	49	21	38	21	1.9	95
219	Millbrook silt loam	63	24	46	24	2.6	125
220	Plattville silt loam, deep phase	63	24	48	24	2.8	135
221	Saybrook silt loam, rolling phase	**62**(E)	**23**(E)	**46**	23	2.7	130
223	Varna silt loam	N	N	36(E)	20(E)	2.1	105
224	Strawn silt loam	43(E)	N	36(E)	20(E)	2.1	100
228	Eylar silt loam	39(E)	18(E)	32	19	1.9	90
229	Monee silt loam	35	18	27	17	N	80
230	Rowe clay loam to clay	**51**	**23**	**36**	**19**	**1.9**	100
232	Ashkum clay loam to silty clay loam	**64**	**27**	**45**	**23**	**2.5**	120
235	Bryce clay loam to clay	**58**	**25**	**41**	**21**	**2.2**	110
238	Drummer clay	V	V	N	N	N	V
240	Plattville silt loam, rolling phase	50(E)	20(E)	43	22	2.4	120
242	Kendall silt loam	55	22	42	23	2.3	115
243	St. Charles silt loam	53(E)	21(E)	40	22	2.4	115

[a] Estimated number of days that one acre will carry one cow.

[b] Letters have the following meanings: D = Soil fertile but yields are variable, depending upon frequency of overflow. E = Crop should not be grown unless erosion-control measures are used. N = Crop not adapted. V = Variability of soil as mapped makes yield estimate impossible.

in Table 1 must be regarded as mainly of current interest. Later figures can be obtained from time to time by writing the Department of Agronomy, Agricultural Experiment Station, Urbana, Illinois.

Know the Requirements of Good Soil Management

The basic requirements for getting the highest practicable yields from the various soils in Kendall county are similar for all of them. Yet there are differences in management requirements which, if neglected, result in disappointing yields. The *use-and-management* paragraphs included in the discussion of each soil type describe these special requirements. The following discussion points out the requirements common to *all* good soil-management programs.

Good drainage is necessary. A poorly drained soil cannot be consistently productive. Those soils in Kendall county that cannot be effectively underdrained need special attention. The problem is to recognize these soils and to provide a surface drainage system that will carry off excess water.

The same soil conditions that prevent tile from providing adequate drainage also limit root penetration. Thus these soils tend to be drouthy. Crops growing on them are sensitive to seasonal conditions and are likely to suffer during rainless periods sooner than crops on more permeable soils.

The soil map shows those areas in Kendall county where it is hard to get effective underdrainage; and the *use-and-management* paragraphs for each soil type (pages 15 to 50) point out possible ways to lessen the harmful effects of poor underdrainage.

Tests must be made for acidity, phosphorus, and potassium. The removal of crops from the land year after year and the dissolving-and-leaching action of rain finally causes soils to become acid and deficient in available plant nutrients. Satisfactory yields cannot be produced on such soils.

Soil tests are an invaluable aid in detecting nutrient deficiencies and in indicating how much limestone, phosphate, or potash to apply in order to correct the deficiencies. It often happens that parts of a field need no limestone or fertilizer, while other parts of the same field are acid or low in available phosphorus or potassium. The soil map and the soil tests taken together reveal these differences and make it possible to apply limestone and fertilizer where needed and in the amounts needed.

Limestone, phosphate, and potash should be applied where tests show need. As pointed out before, soil tests will show whether limestone is needed and how much, and whether available phosphorus and potassium are too low for best yields. If the soil is acid, this unfavorable condition is easily corrected by applying ground limestone. If available potassium is deficient, it can be supplied in a potash fertilizer.

If phosphorus is deficient, a phosphate fertilizer should be applied, but the choice of phosphate fertilizer is sometimes influenced by the type of soil. Both rock phosphate and superphosphate are widely used in Illinois. Rock phosphate costs less per ton, but to most crops except legumes it is not so readily available as is superphosphate. Under some conditions rock phosphate and superphosphate may be used interchangeably or in conjunction with each other, and under other conditions one is superior to the other. On those soils where one gives definitely better results than the other,

that fact is mentioned in the *use-and-management* discussion for each soil type.

The best information on this problem indicates that in Kendall county there are soils that will respond well to rock phosphate and others that probably will not. What the response of some of these soils would be to superphosphate is not known, as there is not yet enough evidence to justify conclusions. The soils that may be expected to respond satisfactorily to rock phosphate are Types 23, 24, 27, 57, 59, 60, 62, 91, 104, 105, 145, 146, 147, 148, 149, 154, 155, 158, 171, 193, 194, 198, 199, 206, 219, 220, 221, 223, 224, 228, 242, and 243. Types 23, 91, 147, 194, 223, and 228 would not be expected to give as good response as Type 146 (see pages 30 and 31).

On all these soils it seems good practice to apply superphosphate for wheat even though phosphate has previously been applied or the soils test "high" in available phosphorus. Where higher yields of corn are desired on soils already in a fairly high state of productivity, the use of mixed fertilizers such as 3-12-12, 5-15-10, or 3-18-9 may be good practice.

Organic matter must be added frequently. The maintenance of an adequate supply of nitrogen and decaying organic matter in the soil is essential. Nitrogen in large amounts is necessary for vigorous and maximum crop growth (see Table 2). Unlike phosphorus and potassium, nitrogen is not a constituent of the soil minerals — it comes largely from leguminous organic matter. It is therefore important to grow crops that, when properly managed, will leave in the soil a good supply of organic matter high in nitrogen. Nitrogen may also be purchased as a commercial fertilizer,

Table 2. — COMPOSITION OF NINE FARM CROPS

As Grown for the Most Part on Soil Experiment Fields Located on Dark Soils in Central and Northern Illinois

	Crop	Nitrogen	Phosphorus	Potassium	Calcium	Magnesium
		lb.	*lb.*	*lb.*	*lb.*	*lb.*
Corn	Grain, 100 bushels	97	13	25	5	9
	Stalks, 4,480 pounds	38	4	67	24	18
	Cobs, 1,120 pounds	5	Trace	9	1	1
	Total	140	17	101	30	28
Oats	Grain, 50 bushels	31	4	13	2	3
	Straw, 1,700 pounds	7	1	47	6	3
	Total	38	5	60	8	6
Wheat	Grain, 25 bushels	22	4	9	1	3
	Straw, 2,000 pounds	10	1	16	4	2
	Total	32	5	25	5	5
Soybeans	Grain, 25 bushels	95	5	28	4	4
	Straw, 2,840 pounds	31	1	15	46	26
	Total	126	6	43	50	30
Alfalfa	Hay, 2,000 pounds	58	4	39	36	9
Bromegrass	Hay, 2,000 pounds	30	3	44	8	3
Red clover	Hay, 2,000 pounds	55	3	40	38	9
Soybean	Hay, 2,000 pounds	52	3	18	28	18
Timothy	Hay, 2,000 pounds	20	3	31	6	4

Analyses by H. J. Snider.

and if judiciously applied in this form during periods of high grain prices may bring a profit.

Besides supplying nitrogen, decaying organic matter tends to keep the soil in good physical condition. Sticky clay, clay loam, and silty clay loam soils are loosened up, made more "mellow" and easier to till. Coarse-textured fine sandy loams and loamy sands are bound together better, are moved less by wind action, and retain more moisture.

A good crop rotation must be used. A good rotation which includes deep-rooting legumes and fibrous-rooted grasses not only provides nitrogen and fresh organic matter but also makes it possible to maintain good physical condition in the deeper portions of the soil as well as in the surface 6 inches. These deeper parts of the soil must be kept porous enough so that water can pass down into and through them. Deep-rooting legumes help to produce and maintain this porous condition. Too often the physical condition of a soil is judged by the surface layer alone. The deeper, hidden parts of the soil are sometimes just as important as the surface in determining physical condition.

Not only is it important to adopt a good rotation — it is just as important to return to the soil all crop residues and part of the top growth of the legumes. If all top growth is taken off or grazed close, much of the value of the rotation will be lost.

Another problem to be considered when selecting a rotation is the tendency of most soils to develop a compacted surface and a "plow sole," or compacted layer, just beneath the surface layer. These compacted layers retard underdrainage and may limit the development of a good root system. Deep-rooting legumes, such as sweet clover and alfalfa, along with fibrous-rooted grasses are the best remedy now known for lessening or preventing the development of these unfavorable conditions.

The four-field cropping system outlined below shows a type of rotation that has many advantages for corn-belt farms. The alfalfa-brome stays down two years; thus a farmer gets crops two years with one seeding. This system also provides a green manure catch crop, sweet clover, to be plowed down for corn. Good stands and growth of catch-crop sweet clover are an essential part of this system. In order to obtain such stands, proper soil treatment and other good farming practices, including the control of insects, such as sweet clover weevil, are necessary. On soils that should be fall-plowed (such as Types 67, 152, 230, 232, and 235), the sweet clover will be hard to kill.

	Field 1	Field 2	Field 3	Field 4
1952	Corn	Corn	Oats (sweet clover)	Alfalfa-brome
1953	Corn	Oats	Corn	Alfalfa-brome
1954	Oats (sweet clover)	Alfalfa-brome	Corn	Corn
1955	Corn	Alfalfa-brome	Oats	Corn
1956	Corn	Corn	Alfalfa-brome	Oats (sweet clover)
1957	Oats	Corn	Alfalfa-brome	Corn
1958	Alfalfa-brome	Oats (sweet clover)	Corn	Corn
1959	Alfalfa-brome	Corn	Corn	Oats

In this system the legumes come at times in the rotation when the nitrogen supply in the soil is lowest. Corn follows deep-rooting legumes and thus benefits from the nitrogen they supply.

A four-field cropping system of this kind can be fitted into various situations without sacrificing its main features. It can be adjusted to differences in soil productivity or the tendency of a soil to erode, to different types of farming,

to the production of new crops, to changing crop prices, or to hazards of weather, insects, diseases, and weeds. Crop choices and split cropping on one or more fields give the flexibility that is needed for meeting these problems.[1]

Following are seven other four-field rotations that can be used instead of the rotation of corn, corn, oats, and alfalfa-brome chosen for illustration. They show further how flexible a four-field rotation is.

Other Four-Field Rotations

1...........	Corn	Corn	Oats	Sod
2...........	Corn	Soybeans	Oats	Sod
3...........	Corn	Soybeans	Wheat	Sod
4...........	Corn	Corn-soybeans	Oats-barley	Sod
5...........	Corn	Oats-soybeans	Wheat-barley	Sod
6...........	Corn	Soybeans-barley	Oats-wheat	Sod
7...........	Corn	Corn-soybeans	Oats-wheat	Sod

(Sod here = legumes or mixed legumes and grasses.)

In Rotations 4 to 7 the fields have been split some years to permit two different crops to be grown.

Erosion control is essential. Suggestions for reducing erosion are made on pages 15 to 50 in the paragraphs on use and management whenever a type needs such protection.

Even on moderately sloping land, the long-time effects of soil erosion must be given serious consideration, especially in those portions of Kendall county that are underlain by slowly permeable glacial till. In those regions a thin blanket of silty material overlies the till, and it is highly important to keep this blanket of good soil-forming material. If erosion completely removes this silty material in the Clarence and the Swygert areas, the producing capacity of the soils is permanently destroyed; in the Saybrook and Elliott areas, productivity is seriously reduced.

On types with gentle slopes the right rotations properly handled will cut erosion to a minimum unless so much soil has already been lost that a vigorous vegetative growth cannot be secured. Full use should be made of grass waterways, winter cover crops, contour cultivation, and other erosion-control practices. There are some areas that should be kept in permanent pasture or used for meadow. Badly eroded areas in the heavy till regions have not yet been successfully used for timber (see Fig. 6).

Detailed directions for controlling erosion will be found in Farmers' Bulletin 1795, "Conserving Corn Belt Soils," published by the U. S. Department of Agriculture, Washington, D. C., and in Illinois Circular 513, "Save the Soil With Contour Farming and Terracing."[2]

Use good tillage practices. Soils that are to produce maximum crop yields must be kept in good physical condition. This is hard to do on any soil that is cultivated frequently — it is especially hard to do on some soils in Kendall county.

Five soil types (Nos. 67, 152, 230, 232, and 235), covering 22 percent of the area of Kendall county, have heavy-textured surfaces that are sticky when wet. If plowed when too moist, these soils dry hard and cloddy and also will develop a compacted layer, or "plow sole." The danger of these unfavorable conditions developing may be reduced by fall-plowing. When fall-plowed, these heavy, nonerosive soils granulate during the winter; thus it is possible to prepare a good seedbed easier and somewhat earlier than when plowing is left until spring.

[1] The subject of crop rotations is discussed in more detail in the U. S. Department of Agriculture Yearbook for 1938, pages 406-430, the Yearbook for 1943-1947, pages 527-536, and in the Yearbook for 1948, pages 191-202.

[2] All Illinois publications listed in this report are available at the date of the issuance of this report. When they go out of print, they are likely to be replaced by others of a similar nature. The newer publications are then sent.

Farming on the contour is recommended for all slopes that have a gradient of more than 1½ to 2 feet in a hundred. Sometimes well-constructed and well-maintained terraces are needed to supplement contour cultivation. Broad but shallow and well-sodded waterways, like the one where the farm adviser is standing, are also important in slowing runoff and reducing erosion. Fig. 4

Nine soil types (Nos. 23, 91, 96, 146, 147, 193, 194, 223, and 228) should not be fall-plowed. They are seriously injured by erosion resulting from improper tillage and may be permanently destroyed. Erosion is especially destructive on these nine soils because it brings the unfavorable glacial till nearer to the surface. These soils should therefore be plowed on the contour and only in the spring. This precaution is especially necessary in areas with slopes of more than 2 or 3 percent. Plowing in the spring may delay planting somewhat, but the choice seems to be either this delay or the eventual complete destruction of these soils. Nine other soil types (Nos. 27, 57, 60, 99, 155, 171, 221, 224 and 240) also probably should never be fall-plowed. These types all occur on slopes greater than 3 or 4 percent. On most of these areas the producing capacity of these soils will not be entirely destroyed by erosion but it will be so seriously reduced that farming to grain crops will become unprofitable.

Illinois Circular 604, "Shall We Fall-Plow or Spring-Plow in Northeastern Illinois," discusses this problem at greater length.

Work Out a Detailed Program

After having identified the soil types that occur on your farm, studied the recommendations for the use and management of your soils, and noted the general recommendations for good soil management, you will be able to organize your land-use and soil-management practices into a more efficient program.

A large map is helpful. In order to study field arrangement, cropping systems, and soil treatment programs, it is often helpful to have the soil map on a large scale. A larger map for any particular farm can be easily made by following the directions given here:

First find on the colored map the section or sections in which your farm lies. Mark off this area with lines ¼ inch apart. Draw lines both across the area and up and down, beginning at the section lines. Since the scale of the colored map is *1 inch to the mile,* the lines ¼ inch apart will represent quarter-mile lines and each quarter-inch square a 40-acre tract.

Now, on a separate sheet of paper, draw lines that are 2 inches apart, making 2-inch squares. With the quarter-mile lines on the colored map as guides and with the outline of the farm in mind, the soil areas on the map that pertain to your farm can be drawn in the 2-inch squares. Then you will have an enlarged map of your farm, with a 2-inch square for a 40-acre tract, or a scale of *8 inches to the mile.*

The soil map can be enlarged to any other scale by following these steps and enlarging the squares proportionately.

Study field boundaries. After the soil map has been enlarged, fence lines and field boundaries can be drawn in.

On most farms in Kendall county it will be found that fence lines and field boundaries are straight lines that usually have no relation to soil types or slopes. On nearly level areas in which the various soil types have similar *use-and-management* requirements, straight field boundaries are an advantage, but in the more rolling parts of the county straight crop lines must be changed and be made to conform to soil types and slopes if the land is to remain permanently productive. Many fields, especially in the rolling areas, contain two or more soils that call for widely different management and different kinds of crops. When the area of any type is very small it often is necessary to farm this small area in the same way as the adjacent area. Often, however, the areas of the different types are large enough so that rotations can be split or boundaries of fields rearranged to allow each type to be devoted to its own best permanent use.

Adjust cropping system. Usually several good field arrangements and cropping systems can be worked out for any given farm. Some farms may require two or more different cropping systems. For example, a farm that includes bottomland, rolling upland, and level upland may require three different crop rotations if these three kinds of land are to be used to best advantage. The three crop rotations must be coordinated, of course, to make an efficient cropping system for the farm as a whole.

The various points of good soil management — adequate drainage; testing for acidity, phosphorus and potassium; application of limestone and fertilizers; selection of a good crop rotation to provide organic matter and nitrogen; erosion control; and good tillage practices — should also be considered carefully in developing the plan.

No set order for changes. As soon as a definite, well-coordinated crop and soil-management plan has been completed, it should be put into operation. There is no regular order, however, in which changes should be made, since conditions vary considerably from farm to farm. If drainage is not adequate, this condition must first be corrected before the best returns can be obtained from a good crop rotation and soil treatment. Also, on acid soils it is necessary to apply limestone before a good rotation, including the proper kind and acreage of deep-rooting

legumes, can be adopted. On acid soils, therefore, limestone should be applied early in the soil-improvement program.

Keep plans up to date. It is important to keep in touch with the latest information on cropping practices and soil treatments. Your farm adviser will be glad to help you plan a good crop and soil-management program for your farm and keep it up to date.

SOIL TYPES OF KENDALL COUNTY, THEIR USE AND MANAGEMENT

In the following section, the various soil types in Kendall county are discussed in *numerical* order, as they are listed in Table 7 on page 53. Table 7 also gives a tabulated summary of the characteristics and properties of the soils. Another numerical list is given in Table 3, which shows the area each soil occupies in the county. An *alphabetical list* is given on page 63, along with the page number within this section where each soil type is discussed.

Blount silt loam (23)

Blount silt loam is a light-colored soil. It is derived from 2 to 3 feet of loess or other friable material deposited on compact and moderately plastic calcareous till of silty clay loam texture. These are the same kind of parent materials as those from which Elliott soils are developed. Blount occurs on gently sloping to moderately sloping areas, the slopes ranging from 1 to 4 percent. It is a very minor type in Kendall county.

Soil profile. Where not eroded, the surface horizon is a yellowish-gray silt loam 5 to 8 inches thick. It is low in organic matter and nitrogen and, where unlimed and unfertilized, it is medium acid, low in available phosphorus, and medium to high in available potassium. The subsurface is a yellowish-gray silt loam 8 to 10 inches thick. The subsoil is a mixed yellowish-brown heavy silty clay loam or silty clay spotted with brown and gray. Calcareous silty clay loam till, which water penetrates slowly, lies below a depth of 25 to 30 inches.

Use and management. In Blount silt loam, surface drainage is moderate, but underdrainage is somewhat slow. Tile should be spaced not more than 4 rods apart to be effective.

Large amounts of leguminous organic matter should be returned regularly to this soil to increase the supply of nitrogen and improve the physical condition. Sweet clover is one of the best legumes to use as a green-manure crop. However, before trying to grow sweet clover, the

Meanings of some technical terms. In discussing soils and giving accurate descriptions of different types, some terms have to be used that may be unfamiliar to many readers of this report. The terms most likely to need explanation are defined on pages 61 and 62. We suggest a study of this list and frequent reference to it.

Table 3. — KENDALL COUNTY SOILS: Areas of Different Types

Type No.	Type name	Area in square miles	Area in acres	Percent of total area
23	Blount silt loam	.16	100	.05
24	Miami silt loam	4.28	2 739	1.33
25	Hennepin gravelly loam	4.04	2 583	1.26
27	Miami silt loam, rolling phase	6.86	4 389	2.14
57	Herbert silt loam, rolling phase	.37	238	.12
59	Lisbon silt loam	7.14	4 569	2.23
60	LaRose silt loam	2.37	1 515	.74
62	Herbert silt loam	.60	386	.19
67	Harpster clay loam	1.41	903	.44
73	Huntsville loam, bottom	7.00	4 481	2.18
82	Millington loam, bottom	1.71	1 096	.53
88	Hagener loamy sand	.14	90	.01
91	Swygert silt loam to silty clay loam	11.00	7 042	3.43
96	Swygert silt loam, rolling phase	.25	161	.08
99	Vance silt loam, rolling phase	2.09	1 336	.65
103	Muck	1.36	870	.42
104	Virgil silt loam	.28	177	.09
105	Batavia silt loam	.65	416	.20
145	Saybrook silt loam	46.51	29 767	14.49
146	Elliott silt loam	9.81	6 279	3.06
147	Clarence silt loam to silty clay loam	7.72	4 941	2.40
148	Proctor silt loam	20.25	12 963	6.31
149	Brenton silt loam	20.54	13 148	6.40
151	Ridgeville fine sandy loam	.06	37	.02
152	Drummer clay loam	48.94	31 321	15.24
154	Flanagan silt loam	15.17	9 708	4.73
155	Proctor silt loam, rolling phase	2.72	1 743	.85
158	Vance silt loam	7.38	4 723	2.30
171	Catlin silt loam	2.30	1 471	.72
191	Knight silt loam	.15	98	.05
193	Elliott silt loam, rolling phase	7.71	4 928	2.40
194	Blount silt loam, rolling phase	.30	189	.09
197	Troxel silt loam	.51	326	.16
198	Elburn silt loam	4.73	3 025	1.47
199	Plano silt loam	7.26	4 645	2.26
206	Thorp silt loam	2.10	1 345	.65
208	Sexton silt loam	.41	263	.13
219	Millbrook silt loam	.06	41	.02
220	Plattville silt loam, deep phase	3.30	2 114	1.03
221	Saybrook silt loam, rolling phase	27.87	17 837	8.68
223	Varna silt loam	.71	456	.22
224	Strawn silt loam	2.25	1 440	.70
228	Eylar silt loam	.86	549	.27
229	Monee silt loam	.15	98	.05
230	Rowe clay loam to clay	2.66	1 701	.83
232	Ashkum clay loam to silty clay loam	3.74	2 392	1.16
235	Bryce clay loam to clay	14.75	9 439	4.59
238	Drummer clay	.31	197	.10
240	Plattville silt loam, rolling phase	.35	225	.11
242	Kendall silt loam	.26	166	.08
243	St. Charles silt loam	3.77	2 412	1.17
G.P.	Pits and quarries	.66	422	.21
	Water	3.07	1 965	.96
	Total	321.04	205 465	100.00

soil should be tested for acidity and limestone applied as needed. Tests for available phosphorus and potassium should also be made and phosphate or potash fertilizers applied as needed, since soils that are low in either of these nutrient materials cannot support a vigorous vegetation.

After this soil has been properly treated, it makes good permanent pasture land. Overgrazing should, however, be avoided especially on the steeper slopes. If Blount is cropped, a rotation that will protect the soil from erosion as much of the time as possible should be adopted.

Miami silt loam (24)

Miami silt loam is a light-colored soil. It is derived from a thin layer of loess on calcareous glacial till which water penetrates freely. These parent materials are the same as those from which Saybrook is derived (see page 28). Miami is light colored because it developed under forest vegetation, while Saybrook is dark, having developed under grass. Miami occurs on gently to moderately sloping areas, the slopes ranging from 1½ to 3½ percent.

Soil profile. The surface horizon is a yellowish-gray silt loam 5 to 8 inches thick. It is low in organic matter and nitrogen and medium acid. It is low in available phosphorus and medium to high in available potassium. The subsurface is a grayish-yellow silt loam 6 to 8 inches thick. The subsoil varies in thickness from 16 to 24 inches and is a mixed brownish-yellow, brown, and gray medium-plastic silty clay loam. Pebbly calcareous glacial till lies below a depth of about 35 inches. Some pebbles usually occur throughout the profile.

Use and management. Surface drainage is good on Miami silt loam, and tile draw well on the few areas that need underdrainage. Erosion is a moderately serious hazard on this soil. It can be controlled by good farming, including liming and fertilizing to encourage vigorous vegetative growth, a good crop rotation, and, where needed, contour farming and grass waterways. Eroded areas produce good pasture if given proper soil treatment and not overgrazed.

Although Miami does not have the reputation of being a "strong" soil, it is responsive to good management. For good management of this soil it is essential to provide for regular and frequent additions of leguminous organic matter and for plowing down all crop residues. The soil tests should be made and, if limestone is needed, enough should be applied to provide for a good growth of sweet clover or alfalfa. If phosphorus is deficient, either rock phosphate or superphosphate will return good crop increases on this soil, judging from the results obtained on the Antioch experiment field, Table 4. The returns for potash, however are less favorable. Used with superphosphate, potash has given a very small profit at Antioch; used with rock phosphate it has shown a slight loss. It is not likely that applications of potash will cause much increase in yield, and they had better not be made unless the soil tests show that potassium is deficient.

Table 4. — SOIL TREATMENT EXPERIMENTS

Antioch Experiment Field in Lake County, 1924-1950[a]

(Located mainly on Miami silt loam borderline to Blount silt loam)

Plot No.	Soil treatment	Average yields per acre			
		Corn (6 crops)	Oats (7 crops)	Winter wheat (5 crops)[b]	Clover-alfalfa (4 crops)[c]
		bu.	*bu.*	*bu.*	*tons*
1	0	25.2	33.1	22.5	1.25
2	LrP	26.7	40.5	38.7	2.70
3	LRrP	30.3	46.0	43.5	2.07
4	LsP	27.1	47.7	42.0	2.75
5	LrPK	27.5	36.8	42.0	2.47
6	LRsP	28.0	49.1	41.6	2.16
7	LRK	24.0	30.7	29.0	1.36
8	LsPK	30.2	48.6	34.9	2.80
9	LRsPK	37.9	52.0	41.1	2.08
10	RsPK	38.8	54.0	40.0	2.01
Increase (or decrease) for—					
	Limestone	−.9	−2.0	1.1	.07
	Residues	4.1	3.4	3.5	−.65
	Superphosphate	13.9	21.3	12.1	.72
	Potash	9.9	2.9	−.5	−.08

KEY TO SOIL-TREATMENT SYMBOLS: 0 = no treatment, R = crop residues (dried blood to supply nitrogen used prior to 1912), L = limestone, sP = superphosphate (bone meal used prior to 1922), rP = rock phosphate (no phosphate used on these plots prior to 1924), K = potash.

[a] Field established in 1902. Present rotation and treatment systems begun in 1924.

[b] A wheat failure in 1934 and a crop of spring wheat in 1938 are not included in the average yields of winter wheat.

[c] Crops of mixed hay grown in 1929 and 1933 are not included in the average yields of clover-alfalfa.

Hennepin gravelly loam (25)

Hennepin gravelly loam in Kendall county occurs chiefly on the Fox river bluffs, with smaller amounts along Big Rock, Little Rock, and Blackberry creeks. Most of it occurs on slopes greater than 15 percent, but the areas vary in both slope and degree of erosion.

Soil profile. In most of the uncleared forest areas where erosion has not been active, this type has a thin soil profile. There is generally a layer of dark, decaying leafmold 1 or 2 inches thick on top of a 3- to 5-inch surface layer of brown to light-brown loam or silt loam. The subsurface is generally yellowish-brown loam or silt loam 3 to 5 inches thick; and the subsoil is yellowish-brown clay loam to gravelly clay loam 12 to 15 inches thick. The underlying calcareous till is loam to silt loam and sandy loam in texture, with varying amounts of gravel. A few pebbles occur throughout the profile and some are also scattered on the surface, along with an occasional boulder.

Use and management. Hennepin gravelly loam should not be cultivated. Many slopes are too steep for the use of ordinary farm machinery, and all slopes greater than 15 percent are quickly damaged by erosion if plowed.

Hennepin areas should be kept in permanent trees or grass. Areas sloping less than 30 percent will often produce good grass and clovers, though a satisfactory stand is sometimes hard to establish and maintain. Areas sloping more than 30 percent should be kept in timber.

On cleared areas that have been severely injured by erosion, the important problem is to get a suitable cover of vegetation as quickly as possible. On areas to be used for pasture a legume-grass mixture should be seeded. Such a mixture may consist of most or all of the following: sweet clover, alfalfa, red clover, Ladino clover, white Dutch clover, bluegrass, timothy, orchard grass or bromegrass. On areas to be reforested black locust is suggested for the most erosive spots. Jack pine and Virginia pine and other slower growing trees such as the oaks and hickories may be used on the less erosive spots as well as to interplant with the black locust. Illinois Circular 567, "Forest Planting on Illinois Farms," gives additional information about reforestation.

Miami silt loam, rolling phase (27)

Miami silt loam, rolling phase, is a light-colored soil. It has developed from thin loess on calcareous glacial till that water penetrates freely. It is similar to Miami silt loam No. 24, except that it occupies steeper slopes, ranging between 3 and 8 percent.

Soil profile. The surface horizon is a grayish-yellow silt loam 4 to 7 inches thick. It is low in organic matter, nitrogen, and available phosphorus. It is medium acid and medium to high in available potassium. The subsurface is a brownish-yellow silt loam 5 to 7 inches thick. The subsoil is a yellowish-brown silty clay loam. Loamy calcareous glacial till, which water penetrates freely, lies below 30 to 35 inches. Some pebbles usually occur throughout the profile.

Use and management. Surface runoff is moderate to rapid on Miami silt loam, rolling phase, and erosion is a constant threat in cultivated fields. It can be materially reduced by good farming practices, including the use of limestone and fertilizers where needed and winter cover crops. However, this soil is worth the effort it takes to preserve it and a well-planned conservation system should be followed. Such a system would require use of both grass waterways and contour cultivation along with some strip cropping or terracing as well as the use of lime, fertilizers, and a crop rotation adapted to this soil (see discussion on pages 9 to 13). Miami produces excellent pasture if properly treated and not overgrazed.

Herbert silt loam, rolling phase (57)

Herbert silt loam, rolling phase, is a moderately dark soil developed from thin loess on calcareous glacial till that is permeable to water. It is similar to Herbert silt loam No. 62, except that it occurs on steeper slopes, ranging between 3 and 8 percent. It is intermediate in properties between Miami silt loam, rolling phase (No. 27) and Saybrook silt loam, rolling phase (No. 221). It is a very minor type in Kendall county.

Soil profile. The surface horizon is a brown to grayish-brown silt loam 6 or 7 inches thick. It is medium in nitrogen and organic matter, low in available phosphorus, medium to high in available potassium, and medium to only slightly acid. The subsurface is a dark yellowish-gray to yellowish-brown silt loam 4 to 7 inches thick. The subsoil is a yellowish-brown silty clay loam. Below a depth of 30 to 35 inches lies calcareous glacial till of loam texture. Some pebbles usually occur throughout the profile.

Use and management. The major problem in the management of Herbert silt

loam, rolling phase, is control of erosion. Loss of the silty loess cover reduces the agricultural value of this soil. Although it does not completely destroy the producing capacity, it does often force a change in use and management.

Applying limestone and fertilizers as tests indicate they are needed will make possible a vigorous growth of vegetation, which is essential for controlling erosion. A rotation that will provide as much winter cover crop as possible should be used. Tillage should be on the contour and fall-plowing avoided.

Lisbon silt loam (59)

Lisbon silt loam is a dark soil formed from thin loess or silty wash on permeable calcareous glacial till of loam texture. It developed under tall-grass vegetation on very gently sloping land, chiefly in the east-central part of the county. Lisbon is one of the best soils in Iroquois county.

Soil profile. The surface horizon of this type is a brown to dark-brown heavy silt loam 7 to 10 inches thick. It is high in organic matter and nitrogen and slightly acid to neutral in reaction. The subsurface is a brown to dark grayish-brown silt loam. The subsoil, which begins at a depth of 15 or 16 inches, is a mottled yellowish-brown to brownish-gray medium-plastic silty clay loam. A few inches of silty or sandy material often lies immediately beneath the subsoil; and calcareous glacial till, permeable to water, generally begins at a depth of 35 to 40 inches.

Use and management. Lisbon silt loam is a productive soil, easy to cultivate, and not subject to erosion except where water from adjacent higher land flows across it. Surface drainage is fairly good on most areas, and tile draw well. This soil, like all soils that are somewhat heavy, tends to form a compacted layer, or "plow sole," just beneath the surface soil unless deep-rooting legumes are grown. Such a layer will retard underdrainage and discourage root penetration.

Although Lisbon is well supplied with plant nutrients, intensive farming will reduce the amounts which are readily available. Soil tests should therefore be made to determine whether Lisbon needs limestone to grow good clover or alfalfa, and whether it is deficient in available phosphorus and potassium. Though no experimental plots are located on this type, it is believed that crops will respond to phosphate where tests show the soil to be low in phosphorus. Where wheat is grown, it probably will be worth while to apply superphosphate. If very high yields of corn are desired, or if only small deficiencies of available phosphorus and potassium exist, a mixed fertilizer, such as 3-12-12 or 3-18-9, is suggested when a good crop rotation and other good farming practices are followed.

LaRose silt loam (60)

LaRose silt loam is a medium-dark soil developed from a thin blanket of loess on calcareous glacial till that is permeable to water. It is similar to Saybrook silt loam, rolling phase, but differs from it in having thinner horizons and in being found on more strongly rolling land. It occurs on slopes ranging in steepness from 5 or 6 to 15 or 18 percent.

Soil profile. The surface of this soil type is a brown to light-brown silt loam 5 to

6 inches thick where erosion has not been active. It is medium in nitrogen and organic matter, medium to slightly acid, low in available phosphorus, and medium to high in available potassium. The subsurface is a yellowish-brown silt loam 6 or 7 inches thick, and the subsoil is a yellowish-brown silty clay loam. Calcareous till of loam texture lies below a depth of 25 to 30 inches. A few pebbles occur in the till and throughout the profile; and where erosion has been severe, some pebbles occur even on the surface.

Use and management. Surface runoff is rapid on areas of LaRose silt loam because of the steepness of the slopes, and control of erosion is a major problem. Removal of the silty loess cover by erosion does not completely destroy the productivity of this soil but does lower it materially. Areas which have lost most or all of the surface and subsoil should be kept in permanent pasture and meadow and should be treated in such a way as to produce and maintain a vigorous vegetative cover. Areas that still have enough surface to produce fairly good cultivated crops should be so handled that soil losses by erosion will be kept to a minimum. It is impossible, however, to prevent all erosion, particularly when clean-cultivated crops are grown. Contour tillage, grass waterways, and terraces help to reduce erosion and should be used wherever needed. Soil tests should be made and any shortages of plant foods should be corrected. Such corrections are necessary in order to produce vigorous growth of any hay, pasture, or cultivated crops. Fall-plowing should be avoided.

Herbert silt loam (62)

Herbert silt loam is a moderately dark soil developed from thin loess on calcareous glacial till of loam texture. This soil type is permeable to water and roots. It is intermediate in properties between Miami silt loam and Saybrook silt loam. It is a minor type in Kendall county.

Soil profile. The surface layer is a brown to grayish-brown silt loam 6 to 8 inches thick. It is medium high in organic matter and nitrogen, medium acid, low in available phosphorus, and medium to high in available potassium. The subsurface is a brownish-gray to gray silt loam 6 to 8 inches thick. The subsoil is a grayish-brown to yellowish-brown silty clay loam. Calcareous glacial till of loam texture lies below 35 to 40 inches.

Use and management. The subsoil and underlying glacial till of Herbert silt loam are moderately permeable to water. Tile may be needed in some areas and will draw well. Erosion is moderately serious but may be satisfactorily controlled by proper soil treatment and cropping practices. The first step is to make tests to determine the needs for limestone, phosphate, and potash. Then, after supplying these needs, a crop rotation should be used that includes a legume-grass green-manure crop at least every fourth year.

Harpster clay loam (67)

Harpster clay loam is a dark, heavy soil which occurs on nearly level and depressional areas. It is found in association with a number of other soils but principally with Drummer clay loam. It was developed from wind- and water-deposited sediments which often rest on glacial till at a depth of about 40 inches.

Harpster was formed under swampy conditions, and the heavy growth of

marsh vegetation added large amounts of organic matter. Its alkaline condition is due to the accumulation of disintegrated shells of fresh-water snails that lived on these grasses. This alkaline condition is the outstanding feature of Harpster.

Soil profile. The surface horizon of Harpster is a black to grayish-black clay loam to silty clay loam varying from 5 to 12 inches in thickness. It is high in organic matter and is alkaline. The grayish cast often observed in this soil is due in part to the many snail-shell fragments present. The subsurface is sometimes indistinguishable. It is usually a very dark-gray or grayish-black clay loam. At 14 to 18 inches it grades into the subsoil, a medium-plastic clay loam to silty clay loam that is dark gray spotted with yellow. Lime concretions and fragments of snail shells occur throughout the profile.

Use and management. The chief problems in the management of Harpster are drainage and correction of the potassium deficiency. It often is not practical to use furrows and ditches for draining Harpster because of its low-lying position. Tile draw well, and the only difficulty in installing a tiling system is to get satisfactory outlets.

This soil is not well adapted to the small grains, as they tend to lodge, but it is a good corn soil after any potassium deficiency has been corrected by the use of such materials as muriate of potash or coarse strawy manure. The use of potash will probably also lessen the tendency of small grains to lodge.

It is advisable also to apply phosphate on this soil. If phosphate is applied separately, it should be in the form of superphosphate rather than rock phosphate. Rock phosphate is not effective on an alkaline soil such as Harpster.

Another method of correcting the deficiencies of both phosphorus and potassium is to apply a mixed fertilizer high in potash, such as 0-10-20 or 0-9-27. As this soil is naturally too alkaline, no limestone should be applied.

Unless good farming practices are followed, there is a tendency for a heavy soil like Harpster to gradually become less permeable to water and therefore more difficult to underdrain. To lessen this danger it is advisable to include in the rotation deep-rooting legumes such as sweet clover. Also, care should be taken not to plow or otherwise till this soil when it is too moist. The decision when to plow should be determined by the condition of the subsurface as well as the surface, for it often happens that even after the surface horizon has dried enough to be plowed, the subsurface remains wet and therefore is easily compacted.

Huntsville loam, bottom (73)

Huntsville loam is a dark soil derived from sediments deposited by streams. It occurs mainly along Big Rock and Little Rock creeks. Along Blackberry and Waubansee creeks the bottomlands are wetter and the sediments are blacker and more mucky than true Huntsville soil although, on the map, they are shown as Huntsville.

Soil profile. Huntsville has no definite profile development. The surface layer is variable but is usually a dark-brown or dark grayish-brown mixed sandy loam to silt loam. It ranges from moderately high to high in organic matter and nitrogen and usually is neutral or only slightly acid. The materials beneath the surface layer are variable in texture and color. The darker shades, however, predominate, and rusty-brown splotches are

sometimes present below a depth of about 25 inches.

Use and management. Many of the bottoms in Kendall county are narrow and irregular and not well suited to cultivation. It is common practice to use such bottoms for pasture, and this is considered their best use. The wider bottoms are suitable for cultivation but are subject to flooding. Local experience must be depended on to decide whether such bottoms should be cropped.

No soil treatment is advised for this soil because of frequent overflow.

Millington loam, bottom (82)

Millington loam is a bottomland soil. It occupies much of Fox river bottom from the town of Oswego to the town of Millington, from which the name for the soil type was taken.

Soil profile. The surface horizon is a grayish-brown to black silt loam or loam 10 to 20 inches thick. It is high in organic matter and nitrogen and highly calcareous. The high carbonate content is due primarily to an accumulation of snail shells. Available potassium is often low. The subsurface is not well developed. It is usually more gray than the surface and grades into the underlying mixed water-laid sediments. All of the sediments are highly calcareous.

Use and management. Much of the Millington loam in Kendall county occurs as narrow strips of land between Fox river and the steep bluffs or as islands in the river, and its usefulness is therefore limited mostly to pasture. Areas large enough to cultivate economically and that are properly fertilized will produce fairly good crops of corn and various legumes and grasses. Since there already is an excess of lime, no limestone should ever be applied. Along with the high lime content, however, there often is a deficiency of available potassium and sometimes also of available phosphorus, and these plant nutrients need to be supplied in order to get maximum crop yields.

Hagener loamy sand (88)

Hagener loamy sand is a medium-dark soil developed on gentle to moderate slopes from wind and water deposited sands. It is a very minor type in Kendall county.

Soil profile. The surface layer is brown to light-brown loamy sand, medium in organic matter and nitrogen, medium acid, and low in available phosphorus. It varies in thickness from 6 or 8 inches to as much as 15 or 20 inches. The subsurface is yellowish-brown to brownish-yellow loamy sand to sand to a depth of 40 inches or more.

Use and management. Hagener loamy sand is drouthy and in addition is subject to movement by strong winds. The management system should therefore be designed to increase the water-holding capacity of this soil and reduce wind erosion. The first step is liming and fertilizing according to the results of soil tests, in order to get the best crop growth. This should be followed by the growing of adapted grasses and clovers for both pasture and green manure. Organic matter plowed under helps to hold moisture and to increase the supply of nitrogen; these improvements in turn help to increase crop growth, and good crop growth helps to reduce movement of the sand by the wind.

Hagener is only a moderately produc-

tive soil, as good yields depend mainly on an adequate and well-distributed rainfall. Corn should not be grown frequently. Small grains, grasses, and clovers should make up a high percentage of the crop rotation.

Swygert silt loam to silty clay loam (91)

Swygert silt loam to silty clay loam is a dark soil formed from thin silty wind-deposited loess on compact and plastic calcareous glacial till. It occurs on gently sloping to moderately sloping areas and occupies a total of about 7,000 acres in Kendall county.

Soil profile. The surface horizon of this type is a brown to dark-brown heavy silt loam 7 to 10 inches thick. It is medium in organic matter and nitrogen, medium to slightly acid, and low in available phosphorus. The subsurface is a grayish-brown heavy silt loam to silty clay loam. The subsoil, which begins at a depth of 12 to 15 inches, is a mottled brownish-gray plastic silty clay. Heavy, plastic, calcareous till lies beneath the subsoil and extends to an unmeasured depth.

Use and management. The surface drainage of Swygert silt loam to silty clay loam is moderate to rapid, but underdrainage is slow. During heavy rains this slow underdrainage causes excessive runoff, which may in turn cause severe erosion. Areas that have been eroded down to the heavy, plastic subsoil or underlying till are extremely difficult to cultivate and are unproductive. It is therefore important to reduce to a minimum the loss of surface soil by erosion. Each field must be studied to determine the best management for it in order to get best results.

Well - planned and well - maintained grass waterways are important for reducing erosion. All areas that slope more than 1 to 2 percent should, if possible, be tilled on the contour. In cornfields

Here is a field of Swygert silt loam being ruined by up-and-down cultivation and unsodded waterways. Fields like this rapidly lose their productive surface layer of silt loam, cultivation becomes difficult, and crop yields are seriously decreased. Fig. 5

another good way to reduce erosion during the late fall, winter, and spring is to roll down the stalks at right angles to the slope. The value of terracing on this soil is questionable, unless the terrace ridges are always inspected for cracks following dry periods. Cracks are likely to form across the terrace ridges because the soil is high in very fine particles that expand when wet and contract when dry. These cracks should be filled with soil material; otherwise they are likely to allow gullies to form in the ridges during heavy rains.

The owners and operators of farms on Swygert should realize that injury of this soil by erosion is permanent and often rapid. Crops should be so managed that a legume-grass sod occupies this soil one or more years out of every four. All crop residues should be turned under. All available manure should be carefully preserved and applied where most needed.

Thorough soil tests should be made in order to have a good basis for the liming and fertilizing program. This soil type will most likely respond to fertilizers in the same way as Elliott silt loam (see pages 29 and 31). Yields will be somewhat less than on Elliott (see Table 1, page 8), but the response to phosphate and potash should be similar. Results from the Joliet field (Table 5, page 30) are of interest to one farming this soil.

Swygert silt loam, rolling phase (96)

Swygert silt loam, rolling phase, is a moderately dark soil formed from a very thin silty loess deposit on compact and plastic calcareous glacial till. It is associated with both Swygert and Clarence silt loam to silty clay loam but occurs on steeper slopes. It is a very minor type in Kendall county.

Soil profile. The surface horizon is a brown to light-brown heavy silt loam. Where not eroded, it is 6 to 8 inches thick. It is medium in nitrogen and organic matter, medium to slightly acid, and low in available phosphorus. The subsurface is a yellowish-brown silty clay loam, and the subsoil is a mottled grayish-brown plastic silty clay, beneath which is heavy plastic calcareous till of heavy silty clay loam to silty clay texture.

Use and management. Runoff is high and erosion is severe on Swygert silt loam, rolling phase, because water passes through the subsoil and underlying glacial till but slowly and the slopes are moderately steep. Much of this soil type as mapped is already eroded down to the subsoil or to the till. These eroded portions are extremely difficult to farm, are low in productivity, and cultivated crops should not be grown on them. A permanent legume - grass sod should be established if possible and only moderate use made of it for hay and pasture. The problem is to secure a stand of clovers and grasses at a low enough cost to be justified. This will mean the use of limestone where needed and the addition at regular intervals of moderate amounts of readily available phosphorus and possibly of potassium. Seeding may have to be done in early spring so that freezing and thawing will cover the seeds, as it is nearly impossible to prepare a satisfactory seedbed on these eroded spots. Trial plantings of black locust, Scotch pine, and Jack pine on a severely eroded Swygert soil in Iroquois county resulted in failure (Fig. 6). It is evident that few or no trees will survive or grow well on these spots.

Areas of this soil type which are not yet severely eroded should be farmed

In a few places in Kendall county, in the Clarence and Swygert soil areas, the slopes are eroded like the foreground in this picture from Iroquois county. On such slopes neither grain, pasture, nor timber can be grown at a profit. Only 4 percent of the jack pine planted on this spot of eroded Swygert soil survived; and those trees were of poor quality and only 2 to 7 feet high at eleven years of age.

Where the soil was only slightly eroded 77 percent of the jack pine survived (extreme background in left two-thirds of picture). At ten years of age these trees were of good quality and averaged 12 feet in height. Fig. 6

cautiously. A long rotation should be adopted which does not have a cultivated crop more than once every 5 or 6 years. Legume-grass sod meadow or pasture should occupy this soil more than half the time.

Vance silt loam, rolling phase (99)

Vance silt loam, rolling phase, is a light-colored soil formed from thin silty material on sandy, gravelly water-deposited sediments. It occurs on slopes varying from about 3 to 10 percent.

Soil profile. The surface layer is a yellowish-gray silt loam 4 to 6 inches thick, low in organic matter and nitrogen, medium acid, and low in available phosphorus. The subsurface is a brownish-yellow silt loam. The subsoil is a brownish-yellow, slightly plastic, clay loam. Beneath the subsoil is the sandy, gravelly water-deposited material that is sometimes calcareous at a depth of 45 or 50 inches. Some pebbles usually occur throughout the profile and scattered on the surface.

Use and management. The subsoil of Vance silt loam, rolling phase, is moderately permeable to water, and surface runoff is moderately rapid on the steeper slopes. The system of management should be designed to reduce erosion, which is moderate to severe. This means liming and fertilizing the soil according to needs shown by the soil tests, and the use of a rotation that includes a high proportion of sod crops.

The slopes are mostly rather short,

and contour cultivation is not generally practicable. Grass waterways should be established in the gullies that carry considerable water. Other areas that are already eroded down to the subsoil can be made to produce fairly good crops by a well-planned fertilizing program; but the best way to handle most of these eroded areas may perhaps be to keep them in pasture.

Muck (103)

Muck is of minor importance in Kendall county, occupying a total area of only about 870 acres. It has developed in poorly drained swampy flats or basinlike depressions where the water table was once high throughout the year. Several large areas occur near the town of Bristol Station and in the elongated basin south of Oswego.

Soil profile. No profile development has taken place in this type. The surface material, which varies in thickness from a few inches to several feet, consists mainly of well-rotted plant remains or other organic matter, with varying amounts of silt and clay. It is black, neutral to calcareous in reaction, and low in available potassium. Areas that are calcareous are especially low in available potassium and often also low in available phosphorus. The underlying material is often calcareous and marl-like.

Use and management. On many areas of Muck, surface drainage is slow but underdrainage is good if an outlet is available.

Undrained areas are best used for permanent pasture. Drained areas that are fertilized with potash are adapted to truck crops, hay, and corn. The small grains, soybeans, and clovers, however, grow so rank that they frequently lodge. This difficulty may be partly overcome by applying a phosphate-potash fertilizer such as 0-9-27 or 0-10-20.

Virgil silt loam (104)

Virgil silt loam is a moderately dark soil formed from 40 or 50 inches of loess on calcareous glacial till of sandy loam texture. It occurs on areas that are nearly level or that have a slope of less than 1 percent. It is intermediate in properties between Elburn silt loam and Kendall silt loam. It is a very minor type in Kendall county, occupying only 177 acres.

Soil profile. The surface horizon is a brown to grayish-brown silt loam 6 to 8 inches thick, medium in nitrogen and organic matter, medium acid, and low in available phosphorus. The subsurface is a brownish-gray silt loam, and the subsoil is a mottled grayish-brown silty clay loam. Beneath the subsoil is a layer of silty material several inches thick below which lies glacial till. The upper few inches of the till is noncalcareous clay loam that is mottled, sticky, and gravelly, whereas the lower till is calcareous and of a sandy loam texture.

Use and management. Virgil is a moderately good general farming soil, somewhat lower in productivity than Elburn silt loam but somewhat higher than Kendall silt loam. The subsoil is moderately permeable to water, and tile draw well. Limestone and fertilizer treatments should be made according to soil tests, and the crop rotation should include a legume green-manure crop at least once every four years. (See suggestions for rotations on pages 11 and 12.)

Batavia silt loam (105)

Batavia silt loam is a moderately dark soil derived from 40 to 50 inches of loess on calcareous glacial till of sandy loam texture. It developed under a combination of trees and grass or else under a recent encroachment of forest into the prairie. It occurs on gentle slopes and has better internal drainage than Virgil. It is intermediate in properties between Plano silt loam and St. Charles silt loam.

Soil profile. The surface horizon is light-brown to grayish-brown silt loam 6 to 8 inches thick. It is medium in organic matter and nitrogen and medium acid. It is low in available phosphorus. The subsurface is a grayish-yellow silt loam, and the subsoil is a yellowish-brown silty clay loam. Beneath the subsoil are several inches of silt loam below which is glacial till. The upper few inches of the till are leached to a dark yellowish-brown sticky gravelly clay loam, while the lower till is calcareous and of a sandy loam texture.

Use and management. Tile are generally not needed in Batavia silt loam as the subsoil is moderately permeable to water. Harmful erosion occurs on slopes greater than 3 percent but may be easily controlled by good farming. This includes liming and fertilizing according to soil tests and the use of a rotation that has not more than two cultivated crops every five years. Many of the slopes are long and are suited to contour cultivation. Batavia is intermediate in productivity between Plano and St. Charles soils.

Saybrook silt loam (145)

Saybrook silt loam is a dark soil. It has developed under prairie vegetation from a thin blanket of loess on calcareous glacial till into which water penetrates readily. It is found on gently sloping to moderately sloping areas. Where the slope becomes less than about 1 percent, Saybrook grades into Lisbon silt loam. It is an important soil type in Kendall county, occupying a total area of nearly 30,000 acres.

Soil profile. The surface horizon of Saybrook is a brown to dark-brown silt loam 6 to 10 inches thick. It is medium high in organic matter and nitrogen and medium acid. The subsurface is a light-brown to yellowish-brown silt loam. The subsoil, which begins at a depth of 14 to 16 inches, is a brownish-yellow moderately plastic silty clay loam to clay loam 16 to 22 inches thick. There are usually a few inches of leached till in the lower part of the subsoil. At a depth of 35 to 40 inches this leached material grades into friable, calcareous glacial till of loam texture.

Use and management. Saybrook silt loam is a productive soil that is easy to work. On the more sloping portions of the type there is some erosion. The loss of the silty material that overlies the till reduces the productivity of this soil, but the effect is not so serious as similar loss on the heavy till types, such as Elliott, Swygert, and Clarence. Contour tillage, grass waterways, and a good rotation should, nevertheless, be used to reduce the amount of erosion. Saybrook is well adapted to terracing, and on some areas a well-designed and well-maintained terrace system is advisable.

Vigorous plant growth is necessary for a successful erosion-control program. Soil tests should therefore be made, and limestone, phosphate, and potash applied if need for them is indicated.

There is no experiment field located on Saybrook, but it is reasonable to suppose that if tests show a shortage of phosphorus and if a good rotation is used, this soil will respond to phosphate fertilizer. Either rock phosphate or superphosphate may be used. The response to phosphate will be less in a manure or livestock system of farming than in a residues or grain system.

Saybrook is not likely to be low in potassium. Each field should be tested, however, and if there is a shortage of this element, potash must be applied in order to get maximum yields. If the soil is deficient in both phosphorus and potassium, these elements may be supplied in a mixed fertilizer such as 0-12-12 or 0-20-10, or separately as muriate of potash and either rock phosphate or superphosphate.

Saybrook should not be plowed in the fall, especially on areas that slope more than about 2 percent. Such areas should be protected as much as possible against erosion during the fall, winter, and spring by crop residues and cover crops.

Further information about the use of potash and phosphate will be found in connection with Elliott silt loam. While Saybrook differs from Elliott in several ways, its response to fertilizers would likely be similar.

Elliott silt loam (146)

Elliott silt loam is a moderately important soil in Kendall county. It is a dark soil and was formed under grass from thin loess on compact calcareous glacial till through which water penetrates moderately slowly. It occurs on gently sloping to moderately sloping areas. Surface drainage is moderate to rapid, whereas underdrainage is moderately slow. The subsoil and underlying glacial till, in their plasticity and permeability to water, are intermediate between Saybrook silt loam and Swygert silt loam to silty clay loam.

Soil profile. The surface horizon of Elliott is a dark-brown heavy silt loam 6 to 10 inches thick. It is medium in nitrogen and organic matter, low in available phosphorus, and slightly to medium acid. The subsurface is a brown to light-brown silt loam 4 to 6 inches thick. The subsoil, which begins at a depth of 14 to 16 inches, is a mixed brownish-gray and yellowish-gray medium-plastic silty clay loam. Below a depth of 30 to 35 inches there is compact calcareous glacial till of clay loam to silty clay loam texture.

Use and management. Good soil management for Elliott silt loam must provide for four things: (1) the control of erosion, (2) the correction of soil acidity, (3) the maintenance of enough nitrogen and organic matter for good crop growth, and (4) additions of phosphate and potash in amounts shown by the soil tests to be needed.

Except where areas slope more than about 2 percent, erosion can be controlled satisfactorily in general farming by using good farming methods. Such methods include the soil treatment necessary to obtain good crop growth, contour farming and grass waterways, and protection of slopes by leaving crop residues on the surface to slow down the rate of runoff during fall, winter, and spring. More water can then penetrate into and be absorbed by the soil; thus less will run off, and erosion will be correspondingly reduced. Rolling down the cornstalks at right angles to the slope,

Table 5. — ROCK PHOSPHATE AND POTASH EXPERIMENTS

Joliet Experiment Field in Will County, 1915-1950

(Located mainly on Elliott silt loam borderline to Swygert silt loam)

Series No.	Average annual yields per acre												Value of increase[a]	
	CORN		OATS		SOYBEANS		WHEAT		CLOVER		ALFALFA		Net annual acre returns without interest[b]	Net annual acre returns with interest[c]
	ROCK PHOSPHATE — Residues system													
	RLrP	Increase for rP	RLrP	Increase for rP	RLrP	Increase for rP	RLrP	Increase for rP	RLrP	Increase for rP	RLrP	Increase for rP		
	bu.	*bu.*	*bu.*	*bu.*	*bu.*	*bu.*	*bu.*	*bu.*	*tons*	*tons*	*tons*	*tons*		
100	50.4	8.1	59.5	9.6	23.1	1.4	31.3	8.0	.93	.48	2.81	1.37	$7.69	$15.61
200	51.1	8.6	70.3	7.3	19.4	1.9	28.6	11.5	1.65	.73	1.51	.71	7.69	14.49
300	47.5	10.0	63.0	8.2	19.7	2.4	29.6	8.4	1.41	.46	....	....	6.01	10.64
400	51.6	8.8	62.2	7.4	23.1	2.8	30.0	8.9	1.12	.43	....	....	5.04	8.41
500	53.7	10.0	62.8	9.4	18.8	1.1	29.7	12.2	1.19	.56	....	....	6.96	11.75
600	57.8	8.3	65.9	5.3	26.6	.7	25.6	6.2	.69	.19	2.35	.54	4.31	7.84
Average[d]	52.5	9.0**	63.5	7.8**	22.5	1.7**	29.1	9.2**	1.16	.48**	2.22	.87**	6.28	11.40
Average 1939-1950	66.4	14.8**	65.9	10.2**	26.6	2.8**	27.9	7.9**	.71	.26	....	....	8.94	11.65
	ROCK PHOSPHATE — Manure system													
	MLrP	Increase for rP	MLrP	Increase for rP	MLrP	Increase for rP	MLrP	Increase for rP	MLrP	Increase for rP	MLrP	Increase for rP		
	bu.	*bu.*	*bu.*	*bu.*	*bu.*	*bu.*	*bu.*	*bu.*	*tons*	*tons*	*tons*	*tons*		
100	58.9	.5	61.5	2.4	25.4	−1.1	32.3	3.6	2.16	.73	2.58	.64	$2.66	$5.59
200	54.8	2.7	65.7	3.1	20.4	−.2	27.2	7.8	2.04	.23	1.64	.78	4.52	8.63
300	51.5	.4	61.0	1.3	31.4	2.2	30.6	2.8	2.22	.29	....	....	.81	−.06
400	63.3	5.2	71.2	7.5	26.7	1.9	30.6	5.4	2.20	.44	....	....	3.94	7.37
500	58.9	4.4	65.5	2.8	23.4	−1.3	30.5	7.9	1.81	.73	....	....	4.07	6.33
600	56.0	2.9	64.1	−.7	32.2	2.8	26.1	4.6	1.80	.34	2.68	.86	3.87	7.93
Average[d]	57.2	2.7*	64.8	2.7*	26.6	.7	29.5	5.3**	2.04	.46**	2.30	.76**	3.31	5.97
Average 1939-1950	69.2	6.3**	70.2	3.2*	26.8	.6	30.0	4.7**	2.23	.62**	....	....	4.92	6.26
	POTASH — Residues system													
	RLrPK	Increase for K	RLrPK	Increase for K	RLrPK	Increase for K	RLrPK	Increase for K	RLrPK	Increase for K	RLrPK	Increase for K		
	bu.	*bu.*	*bu.*	*bu.*	*bu.*	*bu.*	*bu.*	*bu.*	*tons*	*tons*	*tons*	*tons*		
100	57.2	6.8	58.4	−1.0	24.5	1.4	33.2	1.9	1.04	.11	2.77	−.04	$ .15	$−1.66
200	60.9	9.8	69.3	−1.0	23.5	4.1	33.5	4.9	1.23	.15	2.03	.51	3.48	6.62
300	54.1	6.6	61.8	−1.2	20.9	1.2	29.4	−.2	1.63	.23	....	....	−.30	−.79
400	56.7	5.1	63.0	.8	25.1	1.9	34.2	4.2	1.24	.13	....	....	1.06	.86
500	58.4	4.7	64.5	1.7	18.5	−.3	34.8	5.1	1.32	.13	....	....	.47	1.63
600	57.9	.1	63.9	−2.0	26.9	.3	25.7	.1	.68	.08	2.55	.20	−1.04	−1.42
Average[d]	57.1	5.5**	62.5	−.5	23.2	1.4*	31.4	2.7*	1.19	.14**	2.45	.22	.64	.87
Average 1939-1950	87.2	7.2**	62.6	−.5	29.0	2.9**	29.9	2.1	.99	.02	....	....	1.64	−1.03

KEY TO SOIL-TREATMENT SYMBOLS: R = residues, M = manure, L = limestone, rP = rock phosphate, K = potash.

[a] Crop prices from Illinois Cooperative Crop Reporting Service; rock phosphate and potash are included at cost.

[b] Returns from yield increases less cost of rock phosphate or potash.

[c] Returns from yield increases less cost of rock phosphate or potash plus or minus interest at 4 percent earned or paid out on capital invested in rock phosphate or potash.

[d] Tests of significance were applied only to average crop yield increases. * Odds are more than 19 to 1 that the yield increase is not due to chance. ** Odds are more than 99 to 1 that the yield increase is not due to chance.

if the picker has not already left them well flattened, is effective in reducing erosion.

Areas that slope more than 2 percent need, besides the good farming methods mentioned above, longer crop rotations, with more sod crops and winter cover crops. Fall plowing should be avoided on Elliott silt loam as much as possible, but when it is necessary it should be done on the contour and the land left rough.

After limestone applications based on acidity tests have corrected soil acidity, a good rotation that includes legume catch crops and standover legumes should be adopted.

Strongly sloping areas of Elliott are subject to severe and permanent damage by erosion. These areas are therefore better adapted to livestock farming than to grain farming.

Experience with the Joliet soil experiment field, which is located on a soil intermediate in properties between Elliott silt loam and Swygert silt loam to silty clay loam, may be taken as a guide to the results that may be expected from these two soil types in Kendall county when they are fertilized and managed as the Joliet field has been. Table 5, on page 30, gives the results from this field.

Rock phosphate has been applied to the six series on the Joliet field at rates varying from 8,000 to 8,500 pounds an acre. The first application was made in 1914 and the last in the fall of 1933. Large and consistent increases in yields followed these applications of rock phosphate, but the increases were smaller and less consistent in the manure (livestock) system of farming than in the residues (grain) system. Corn increases due to rock phosphate were larger during the twelve years 1939-1950 than before.

From the above results we can conclude that rock phosphate will return a good profit on Elliott silt loam even when applied in large amounts.

Another experiment on the Joliet field tests the effectiveness of rock phosphate applied at different rates. Limited data indicate that for initial applications moderate amounts are almost as effective as large amounts. In this experiment, conducted from 1928 through 1942, yields of wheat and clover-alfalfa hay were only about 10 percent lower where 1,000 pounds of rock phosphate an acre was applied than where 4,000 pounds was applied. Other experiments indicate that superphosphate also gives substantial crop increases on the Joliet field. In tests of various carriers applied in amounts equal in money values, higher yields of wheat were obtained with superphosphate than with rock phosphate, but for clover-alfalfa hay the reverse was true.

Applications of potash on the Joliet field have brought increased yields of corn, wheat, clover, and alfalfa, but the increases have not been large enough on four of the six series to pay for the cost of the potash. The applications were, however, rather large. Kainit, in amounts varying from 3,600 to 4,200 pounds an acre, was applied to the various series from 1914 to 1933. Potassium chloride has been used since 1932 in amounts averaging between about 80 and 90 pounds an acre a year on the various series during the eighteen years to and including 1950. It might be that smaller applications would give profitable returns. The only way to know what is best for a particular field is to test the soil, and if potassium is deficient, to apply the amount which the test indicates is needed.

Clarence silt loam to silty clay loam (147)

Clarence silt loam to silty clay loam is a medium-dark soil formed from a thin blanket of loess on very compact and very plastic calcareous glacial till or lake-bed clay. It is found on gently to moderately sloping areas, where it has developed under prairie-grass vegetation. It occurs only in the southeastern part of Kendall county.

Soil profile. The surface horizon of Clarence, where not eroded, is a brown to grayish-brown heavy silt loam or silty clay loam 4 to 8 inches thick. It is medium in organic matter and nitrogen, medium acid, and low in available phosphorus.

The subsurface is a grayish-brown to brownish-gray heavy silt loam to silty clay loam. The subsoil, which begins at a depth of 10 to 14 inches, is a brownish-gray to yellowish-gray silty clay to clay, very compact and very plastic. Beneath the subsoil, usually at a depth of 25 to 30 inches, the material is either very heavy calcareous glacial till or lake-bed clay that water penetrates very slowly.

Use and management. Clarence silt loam presents difficult problems in use and management. It erodes easily because the subsoil and underlying till take up water very slowly. Surface runoff is greater on Clarence than on soils through which water seeps more easily. Even under good management, this soil is capable of producing only moderate yields (see Table 1, page 8).

In the successful management of Clarence silt loam, besides using a good rotation, it is necessary to cut down erosion losses to the minimum, provide surface drainage to carry off surplus water, add limestone where needed, and keep the soil as fertile as possible and in the best possible tilth.

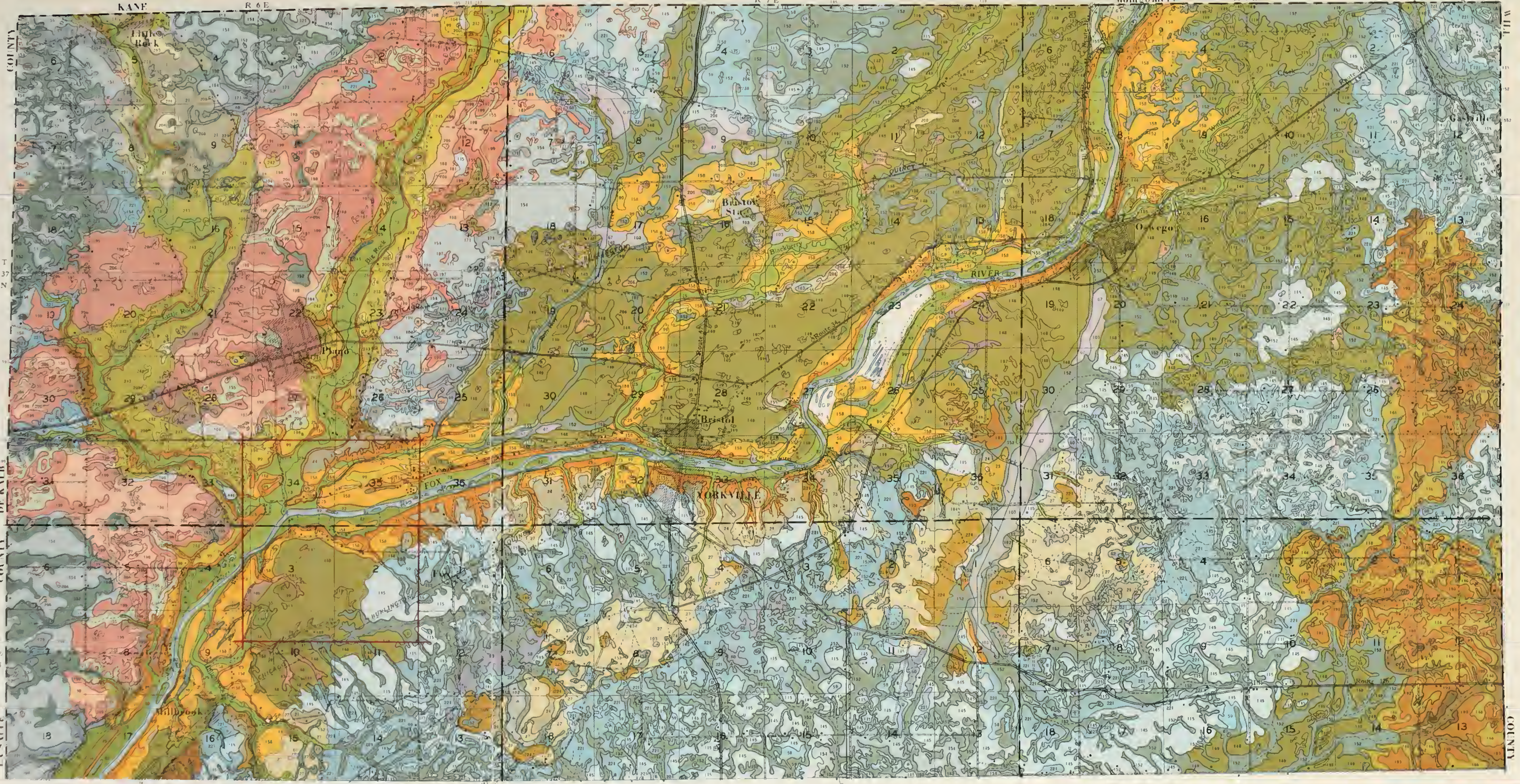
Erosion is best controlled by a well-established permanent grass-and-clover sod. Cultivated crops should be grown as infrequently as practicable and always in a rotation which includes a sod crop at regular intervals. On slopes greater than 1½ or 2 percent, corn should be planted on the contour, and the contours should lead into well-sodded waterways. A large concentration of water must be avoided throughout the cultivated area, and the flow of water should be as slow as possible to avoid soil losses.

Clarence is not well adapted to terracing. During dry weather the terrace ridges often crack and, unless these cracks are filled in, runoff water will channel through them, causing further damage. Sod for terrace outlets and for grass waterways is hard to get started and hard to keep up. This is especially true where the subsoil as well as the underlying till is exposed.

Clarence takes up water slowly and dries out slowly. Tile are not effective, and ponded areas should be surface-drained. Fall-plowing is recommended on nearly level areas but should be avoided on areas that slope more than 1 or 2 percent. Illinois Circular 604, "Shall We Fall-plow or Spring-plow in Northeastern Illinois?" gives some information on where and where not to plow in the fall.

The seriousness of the erosion problem on Clarence cannot be overemphasized. The loss of the thin covering of silty material exposes the underlying highly compact and plastic material, permanently reducing the agricultural value of this soil. Some soils can be restored to normal production after being severely eroded, but Clarence is not one of these soils.

There is no experiment field on Clarence silt loam, but it is reasonable to suppose that on areas not eroded or only slightly eroded, phosphate will give fair



LEGEND

23	Blount silt loam	105	Batavia silt loam	199	Plano silt loam
24	Miami silt loam	145 B	Saybrook silt loam	206 R	Thorp silt loam
25	Hennepin gravelly loam	146 C	Elliott silt loam	208 S	Sexton silt loam
27	Miami silt loam, rolling phase	147	Clarence silt loam to silty clay loam	219 T	Millbrook silt loam
57	Herbert silt loam, rolling phase	148 D	Proctor silt loam		Plattville silt loam, deep phase
59	Lisbon silt loam	149 E	Brenton silt loam	221 U	Saybrook silt loam, rolling phase
60	LaRose silt loam	151 F	Ridgeville fine sandy loam		Varna silt loam
62	Herbert silt loam	152 G	Drummer clay loam	224 W	[illegible]
67	Harpster clay loam	154	Flanagan silt loam	228 X	Eylar silt loam
73	Huntsville loam, bottom	155 H	Proctor silt loam, rolling phase	229 Y	Monee silt loam
82	Millington loam, bottom	158	Vance silt loam	230	Rowe clay loam to clay
88	Hagener loamy sand	171 K	Catlin silt loam		Ashkum clay loam to silty clay loam
91	Swygert silt loam to silty clay loam	191 L	Knight silt loam	235	Bryce clay loam to clay
96	Swygert silt loam, rolling phase	193 M	Elliott silt loam, rolling phase	238	Drummer clay
99	Vance silt loam, rolling phase	194 N	Blount silt loam, rolling phase	240	Plattville silt loam, rolling phase
103	Muck	197 P	Troxel silt loam	242	Kendall silt loam
104	Virgil silt loam	198 Q	Elburn silt loam	243	St. Charles silt loam

CONVENTIONAL SIGNS

House	Paved road (two lane)	Drainageway (crossable)
School	Other hard surfaced road	Drainageway (uncrossable)
Church	Improved dirt road	Pond
Elevator	Secondary dirt and private road	Limestone outcrop
Other public building	Township boundary line	Gravel Pit
Cemetery	County boundary line	Clay Pit
Railroad (steam)	Stream (flowing)	Sandstone Quarry
	Swamp	Limestone Quarry

Scale

0 ¼ ½ 1 2 Miles

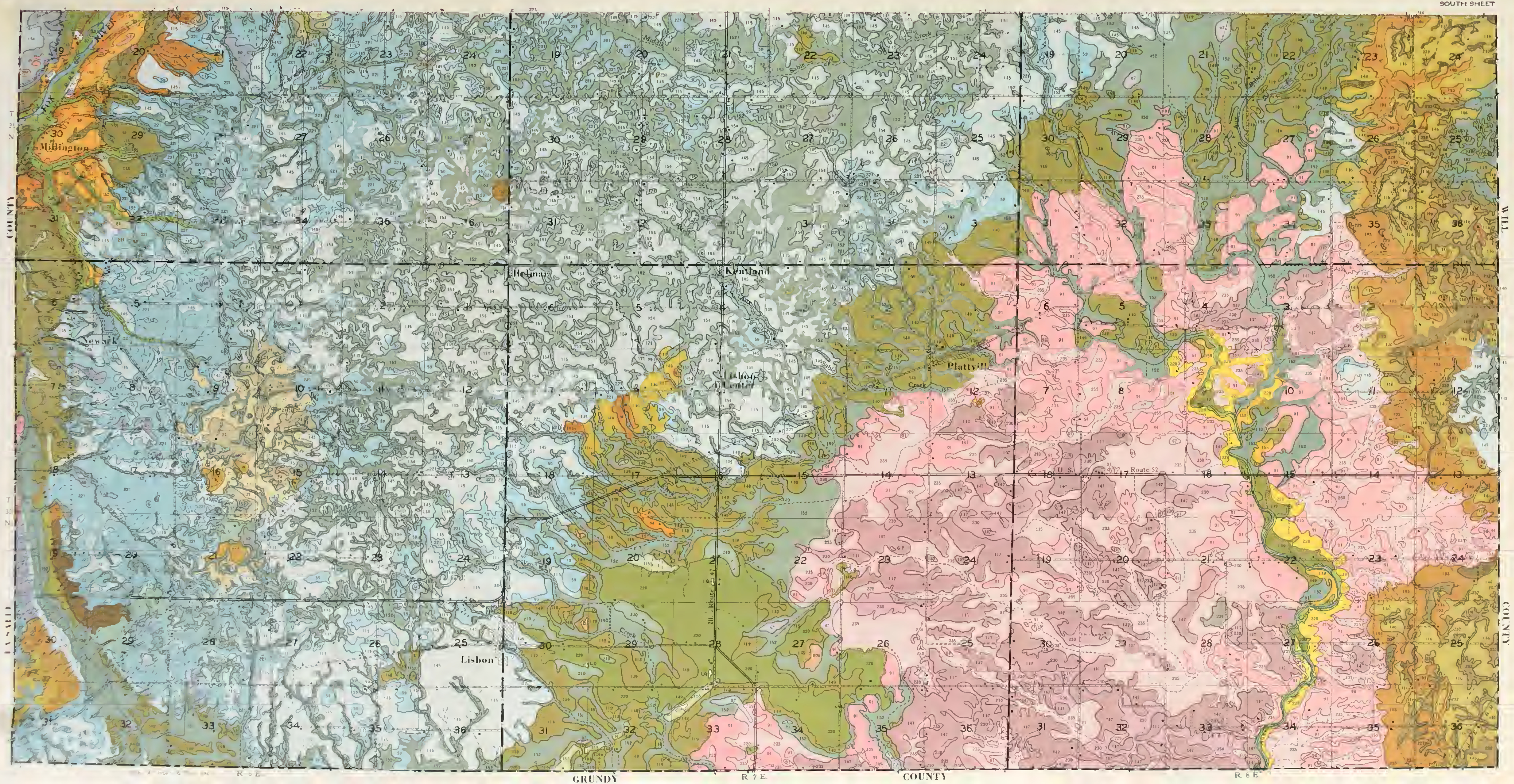
1941

R. S. Smith, in charge Soil Survey

Soils Surveyed by
Herman Wascher, in charge
A. E. Ericsson
J. B. Fehrenbacher
R. T. Odell
T. G. Pearse
F. F. Riecken

SOIL SURVEY MAP OF KENDALL COUNTY

UNIVERSITY OF ILLINOIS AGRICULTURAL EXPERIMENT STATION



LEGEND

23	Blount silt loam
24	Miami silt loam
25	Hennepin gravelly loam
27	Miami silt loam, rolling phase
57	Herbert silt loam, rolling phase
59	Lisbon silt loam
60	LaRose silt loam
62	Herbert silt loam
67	Harpster clay loam
73	Huntsville loam, bottom
82	Millington loam, bottom
88	Hagener loamy sand
91	Swygert silt loam to silty clay loam
96	Swygert silt loam, rolling phase
99	Vance silt loam, rolling phase
103	Muck
104	Virgil silt loam
105	Batavia silt loam
145 B	Saybrook silt loam
146 C	Elliott silt loam
147	Clarence silt loam to silty clay loam
148 D	Proctor silt loam
149 E	Brenton silt loam
151 I	Ridgeville fine sandy loam
152 G	Drummer clay loam
154	Flanagan silt loam
155 H	Proctor silt loam, rolling phase
158	Vance silt loam
171 K	Catlin silt loam
191 L	Knight silt loam
193 M	Elliott silt loam, rolling phase
194 N	Blount silt loam, rolling phase
197 P	Troxel silt loam
198 Q	Elburn silt loam
199	Plano silt loam
206 R	Thorp silt loam
208 S	Sexton silt loam
219 T	Millbrook silt loam
	Plattville silt loam, deep
221 U	Saybrook silt loam, rolling phase
	Varna silt loam
224 W	Strawn silt loam
228 X	Eylar silt loam
229 Y	Monee silt loam
230	Rowe clay loam to clay
Z	Ashkum clay loam to silty clay loam
235	Bryce clay loam to clay
238	Drummer clay
240	Plattville silt loam, rolling phase
242	Kendall silt loam
243	St. Charles silt loam

CONVENTIONAL SIGNS

House
School
Church
Elevator
Other public building
Cemetery
Railroad (steam)
Paved road (two lane)
Other hard surfaced road
Improved dirt road
Secondary dirt and private road
Township boundary line
County boundary line
Stream (flowing)
Swamp
Drainageway (crossable)
Drainageway uncrossable
Pond
Limestone outcrop
G P Gravel Pit
C P Clay Pit
S Q Sandstone Quarry
L Q Limestone Quarry

Scale
0 ¼ ½ 1 2 Miles
1941

R. S. Smith, in charge Soil Survey

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SOIL SURVEY MAP OF KENDALL COUNTY

UNIVERSITY OF ILLINOIS AGRICULTURAL EXPERIMENT STATION

returns. The soil tests should be made and if they show that available phosphorus is deficient, rock phosphate or superphosphate should be applied. Crops are not so likely to give as good a response to potash as to phosphate.

Correction of acidity is necessary on most fields of Clarence silt loam.

Proctor silt loam (148)

Proctor silt loam is a medium-dark soil formed from silty material on coarse sandy and pebbly outwash. It has developed on very gentle to moderate slopes under prairie vegetation.

Soil profile. The surface horizon of Proctor is a medium-brown to light-brown silt loam 6 to 8 inches thick. It is medium in organic matter and nitrogen and medium acid. A small amount of sand and a few pebbles may occur in the surface layer as well as throughout the profile. The subsurface is a brownish-yellow silt loam. The subsoil, which begins at a depth of 15 to 18 inches, is a brownish-yellow slightly plastic silty clay loam or sandy clay loam. At a depth of about 40 inches the subsoil grades into layers of loose silt, sand, and gravel.

Use and management. There is a tendency for Proctor to be drouthy in spots where the underlying sand or gravel occurs nearer than about 35 inches beneath the surface. This, however, is a minor problem, for most areas of Proctor hold water well.

Fresh organic matter should be supplied, as Proctor is rather low in this important material. The soil should be tested for lime and available phosphorus and potassium, and any deficiencies corrected. It will then be possible to use a good rotation, including legumes, which supply nitrogen as well as organic matter.

The glacial outwash and river terrace formations often are underlain by sand and gravel of commercial value. These are promising areas for prospecting for these materials.

Brenton silt loam (149)

Brenton silt loam is a dark soil formed from silty outwash or from a thin blanket of loess, a wind-deposited material, on silty or sandy outwash. It has developed on nearly level to very gently sloping areas under prairie vegetation.

Soil profile. The surface horizon is a brown to dark-brown heavy silt loam 8 to 10 inches thick, high in organic matter and nitrogen and medium to slightly acid. The subsurface is a brown or dark grayish-brown heavy silt loam 4 to 8 inches thick. The subsoil is 15 to 25 inches thick and is a mixed yellow, gray, and brown, moderately plastic silty clay loam. Beneath the subsoil are layers of silt, sand, and gravel of varying thicknesses. These materials may or may not be calcareous. Sometimes glacial till may occur below a depth of 45 or 50 inches.

Use and management. Brenton silt loam is a productive soil. It is well supplied with organic matter, only slightly to moderately acid, and generally well supplied with the plant-food nutrients.

Brenton has moderate to slow surface drainage and moderate underdrainage. The soil profile is permeable to water throughout, and tile draw satisfactorily. However, if the underlying glacial till is heavy and occurs at a depth of less than about 45 inches, there may be some difficulty with underdrainage.

This soil has characteristics intermedi-

ate between Proctor silt loam and Drummer clay loam. Soil tests should be made to detect any nutrient deficiencies, and treatment should be applied in accordance with the needs as indicated by the soil tests. On Brenton silt loam, soil tests are particularly important as a guide in fertilization because there is no experiment field on this soil type that can be used to give additional guidance. With good soil and crop management, this soil will remain productive indefinitely.

Ridgeville fine sandy loam (151)

Ridgeville fine sandy loam is a dark soil formed from sandy glacial outwash. It occurs on nearly level to gently sloping areas. Ridgeville is a very minor type in Kendall county.

Soil profile. The surface horizon is a brown to dark-brown fine sandy loam 8 to 10 inches thick, medium in nitrogen and organic matter and medium to slightly acid. The subsurface is a yellowish to grayish-brown fine sandy loam 6 to 8 inches thick. The subsoil is 15 to 20 inches thick and is a mixed gray, yellowish-brown, and yellowish-gray medium-plastic sandy clay loam. The material beneath the subsoil is stratified sand and gravel with occasional strata of silt and clay.

Use and management. Much of the Ridgeville fine sandy loam has enough slope for good surface drainage. The portions of the type needing underdrainage can be tiled without difficulty as this soil is permeable to water and tile draw well. In planning drainage, some thought should be given to maintaining the water table at a depth of about 30 inches, as this soil has a tendency to be slightly drouthy.

It is necessary to add fresh organic matter at frequent intervals to this sandy soil because decomposition is rapid, making it impossible to build up a reserve supply of either organic matter or nitrogen. Manure should be applied at moderate rates and as frequently as the supply makes possible.

Soil tests for acidity, available phosphorus, and potassium should be made and the liming and fertilizing program be guided by the results of the tests. If the tests show a deficiency of available phosphorus, this soil will respond to either superphosphate or rock phosphate.

Drummer clay loam (152)

Drummer clay loam is a dark soil formed from mixed sand-silt-and-clay outwash or lake-bed sediments. It has developed under marsh-grass vegetation on areas that are nearly level or depressional. It is one of the more extensive types in Kendall county, occupying more than 31,000 acres. A few areas of Harpster too small to be shown on the soil map are included in Drummer.

Soil profile. The surface horizon of this type is a granular black clay loam to silty clay loam 10 to 12 inches thick, high in organic matter and nitrogen, and slightly acid to neutral. The subsurface is hard to distinguish as a separate horizon but is usually a very dark-gray or grayish-black clay loam or silty clay loam. At a depth of 14 to 16 inches the subsurface grades into a mottled dark-gray or brownish-gray medium-plastic clay loam to silty clay loam. Below a depth of 35 to 40 inches the material is usually calcareous and consists of layers of clayey, silty, and sandy sediments with perhaps some gravel below 40 to 50 inches. Occasional areas are somewhat

Tile provide effective drainage for Drummer clay loam, a type that cannot be farmed satisfactorily unless it is drained. Other heavy-textured soils that can be drained with tile if an outlet can be found are Harpster clay loam and Ashkum clay loam to silty clay loam. Fig. 7

gravelly in the surface but the amount of gravel is too small to be of any agricultural importance.

Use and management. Drummer clay loam is a productive soil if well drained and well farmed. Fall-plowing is advisable in order to avoid too much delay when the spring is late. Fresh organic matter should be provided, and deep-rooting legumes should be included in the rotation in order to keep the deeper parts of the profile porous.

Although Drummer will usually grow sweet clover without limestone, it should be tested for acidity as well as for available phosphorus and potassium. With good farming, this soil will remain productive indefinitely. It erodes only when water from higher land runs across it.

The most difficult problem in the management of Drummer, after good drainage has been provided, is to keep the soil from losing its good physical condition. Too much cropping to corn and soybeans during recent years has resulted in an increasingly poor physical condition, causing slower underdrainage and greater difficulty in working down a good seedbed. Rebuilding good tilth is slow work, and the sooner good cropping practices are used, the less trouble there will be in the future.

Flanagan silt loam (154)

Flanagan silt loam is a dark soil derived from 40 to 50 inches of loess on permeable calcareous till of loam texture. It differs from Saybrook in that the till lies deeper.

Soil profile. The surface horizon is a brown to dark-brown heavy silt loam 7 to 12 inches thick, high in organic matter and nitrogen, and medium to slightly acid. It is low to medium in available phosphorus and medium to high in available potassium. The subsurface is a brown to light-brown silt loam. The subsoil, which begins at a

depth of 15 to 16 inches, is a mixed yellowish-brown and grayish-brown silty clay loam. Beneath the subsoil are usually a few inches of silty material, and below a depth of 45 to 50 inches there is calcareous loam till.

Use and management. Flanagan silt loam is a productive soil when well farmed. It is easy to work and has moderately good natural drainage. Tiling is advisable on the nearly level portions of the type. Erosion is a minor problem and may be controlled by good farming, including the use of a good rotation, contour tillage on the more sloping areas, and grass waterways. Soil tests should be made to find how much limestone is needed and whether either a phosphate or potash fertilizer should be applied. In general it should be treated in the same way as described for Saybrook silt loam (see page 28).

Proctor silt loam, rolling phase (155)[1]

The origin and formation of Proctor silt loam, rolling phase, is the same as that of the more level Proctor silt loam, page 33, but this rolling phase occurs on steeper slopes. This soil is a minor type in Kendall county, occupying a total area of less than 3 square miles. It is a dark soil but has a lighter colored surface than Proctor silt loam, and the deeper horizons are more yellowish.

Use and management. Proctor silt loam, rolling phase, is subject to severe erosion and is more drouthy than the more level phase. This rolling phase should be farmed on the contour whenever possible. It is well adapted to terracing wherever the slopes are long enough to permit terrace construction. Soil tests should be made, such treatments applied as the tests indicate are needed, and a rotation in which meadow and pasture are given an important place should be adopted. This soil is well adapted to alfalfa after it has been properly limed and fertilized.

Vance silt loam (158)

Vance silt loam is a light-colored soil formed from a thin blanket of silty material on sandy, gravelly glacial outwash. It occurs on nearly level to gently sloping areas and is found mainly along Fox river and Blackberry creek. A few additional areas occur west of Bristol Station and along Aux Sable creek.

Soil profile. The surface horizon of Vance is a yellowish-gray silt loam 5 to 8 inches thick. It is low in nitrogen and organic matter and is moderately acid. The subsurface has a somewhat more yellowish cast than the surface soil and is a friable silt loam 6 to 8 inches thick. The subsoil, which begins at a depth of 15 to 18 inches, is a yellowish-brown medium-plastic silty clay loam. Some gray and yellow spots, splotches, and streaks occur in the lower part of the subsoil. Underlying the subsoil are layers of silty, sandy, and gravelly materials that are sometimes calcareous at a depth of 40 to 50 inches.

Use and management. Since Vance silt loam is very low in nitrogen and organic matter, these deficiencies have to be corrected before it will grow satisfactory crops. Soil tests should be made, the needed limestone and fertilizers applied, and then a rotation adopted which will provide for frequent additions of leguminous organic matter. If available

[1] Subsequent to the printing of the Kendall county soil map the name Proctor silt loam, rolling phase, was changed to Stockland loam.

phosphorus is deficient, superphosphate will probably give quicker returns than rock phosphate.

The more level portions of this type need tiling. As tile draw well, improving the underdrainage is not difficult.

Vance silt loam is not a "strong" soil but it responds well to good farming. It does not produce satisfactory yields unless well farmed under a program that provides adequate amounts of nitrogen and fresh organic matter.

Catlin silt loam (171)

Catlin silt loam is a dark soil developed from 40 to 50 inches of loess on calcareous till of loam texture, which is permeable to water. It differs from Flanagan, with which it is closely associated, in being better drained. It differs from LaRose in being developed from thicker loess, and from Plano in having underlying till that is more loamy in texture and that has carbonates at a shallower depth.

Soil profile. The surface layer is a brown to light-brown silt loam 6 to 10 inches thick, Moderately high in nitrogen and organic matter, and medium acid. It is medium to low in available phosphorus and medium to high in available potassium. The subsurface is a light-brown to yellowish-brown silt loam 5 to 8 inches thick, and the subsoil is a yellowish-brown silty clay loam. Calcareous friable loam till is found below a depth of 45 or 50 inches.

Use and management. Catlin silt loam is a productive soil when well farmed. It is naturally well drained, and artificial drainage is usually not needed. Sheet erosion is a problem, however, because of the rolling topography, and any system of management should be designed to reduce erosion as much as possible.

The basic treatment for this soil — and the first step in controlling erosion — includes the application of limestone, phosphate, and potash fertilizers in amounts needed in order to grow good crops. Contour farming gives added protection. In some fields strip cropping, along with perhaps some terracing and good grass waterways, should be used in order to hold erosion to a minimum. On the more rolling areas fall-plowing should be avoided, and intertilled crops, such as corn and soybeans, ought not to appear frequently in the rotation.

Knight silt loam (191)

Knight silt loam is a dark soil developed from silty wash material underlain by moderately coarse-textured glacial till or outwash. It occurs in depressions that have no surface outlet.

Soil profile. The surface horizon is a dark-brown to black silt loam varying from 10 to 20 inches in thickness. It is high in organic matter and nitrogen, medium to slightly acid, low in available phosphorus, and medium to high in available potassium. The subsurface is a gray to light-gray silt loam varying in thickness from 10 to 20 inches or more. The subsoil is a gray to dark-gray plastic clay loam to heavy silty clay loam that averages about 20 inches thick and usually occurs below a depth of 30 inches. It may sometimes occur even as deep as 45 or 50 inches.

Use and management. The first requirement in the proper management of Knight silt loam is the removal of excess

surface water so that crops do not drown out. Since surface outlets are not usually possible, underground outlets must be used. Probably the simplest and most practical method to get such an outlet is to dig a hole through the heavy subsoil to the underlying coarse-textured material, using a post-hole digger or an auger.

After drainage is taken care of, the soil should be tested and limestone and phosphate or potash fertilizers applied as needed. Because most spots of Knight silt loam are small, it is not practical to use a special cropping system on them. They will need to be farmed as nearly as possible in the same way as the rest of the field.

Elliott silt loam, rolling phase (193)

Elliott silt loam, rolling phase, is a moderately dark soil formed from a thin blanket of silty material on compact calcareous glacial till of a silty clay loam texture. It occurs on moderate slopes and is subject to severe erosion. Fortunately it is not a major type in Kendall county, totaling only about 8 square miles.

This soil may be thought of as intermediate in character between Elliott silt loam and Varna silt loam. Surface runoff is more rapid than on the more level phase of Elliott but less rapid than on Varna, and it is intermediate between these two in tendency to erode.

Soil profile. The profile of Elliott silt loam, rolling phase, varies in thickness because of differences in erosion. The following description applies to those areas that are not severely eroded.

The surface horizon is a brown silt loam 5 to 7 inches thick. It is medium in nitrogen and organic matter, medium acid, and low in available phosphorus. The subsurface is a light-brown or yellowish-brown silt loam 2 to 8 inches thick. The subsoil is from 16 to 20 inches thick and is a pale yellowish-brown medium-compact and medium-plastic clay loam. The material below a depth of 25 to 35 inches is a compact calcareous glacial till that is moderately slowly permeable to water.

Use and management. Elliott silt loam, rolling phase, should be used mainly for pasture and meadow. Intertilled crops may be grown at infrequent intervals after a good sod has been plowed down. The intertilled crops should, however, always be planted on the contour, and the contours should lead into grass waterways.

Soil tests should be made and limestone and fertilizer applied as needed, so that a vigorous vegetative growth may be secured. Erosion cannot be effectively controlled without such vegetation. Fall-plowing should be avoided, but if it is necessary it should be done on the contour and the plowed surface should be left rough.

Blount silt loam, rolling phase (194)

Blount silt loam, rolling phase, is a light-colored soil developed under forest vegetation from 30 inches or less of the loess on calcareous compact glacial till of silty clay loam texture. It occurs on slopes ranging from 5 to 15 percent. It is a very minor type in Kendall county.

Soil profile. The surface horizon is a yellowish-gray silt loam 5 to 7 inches thick, low in organic matter and nitrogen, and medium acid. It is low in available phosphorus and medium to high in available potassium. The subsurface is a grayish-yellow silt loam 6 to 8 inches

thick. The subsoil is a yellowish-brown heavy silty clay loam. Compact calcareous till of silty clay loam texture lies below a depth of 28 to 32 inches.

Use and management. Surface runoff is rapid and erosion is a problem on all areas of Blount silt loam, rolling phase. Cultivated crops should not be grown unless planted on the contour. Where the slopes are long, grain crops should be interstripped with clovers and grasses. The soil should be tested and limestone and phosphate and potash fertilizers applied as needed in order to secure maximum plant growth. Pastures should not be overgrazed. Where areas of this soil are farmed, all waterways should be kept in permanent sod. If terraces are used to break up long slopes, all outlets should be well sodded before the terraces are constructed. The best use of this soil is for permanent pasture or woodland.

Troxel silt loam (197)

Troxel silt loam is a dark soil developed from silty wash material on moderately coarse glacial till or outwash. It occurs in depressions that usually have no surface outlet. It differs from Knight silt loam in having a thicker dark surface, a more brownish subsurface, and a more brownish subsoil that is less sticky.

Soil profile. The surface is a dark-brown to black silt loam varying in thickness from 15 to 30 inches or more. It is high in nitrogen and organic matter and about neutral in reaction. It is low to medium in available phosphorus and medium to high in available potassium. The subsurface also varies in thickness and sometimes has not developed. Where present, it is usually a brown or very dark yellowish-brown silt loam. The subsoil is a brown, grayish-brown, or yellowish-brown moderately plastic silty clay loam.

Use and management. Troxel silt loam occurs in depressions. However, since the subsoils are moderately permeable to water and the underlying material is coarse and loose, many areas do not need artificial drainage to produce crops. Those areas that do need to be drained in order to yield maximum crops may be tiled. Tiling may, however, be costly if the depressions are deep or far from an outlet. The simplest and probably the most practicable method of draining spots of this soil is to dig a hole down to the coarse underlying material, using an auger.

Because most spots of Troxel silt loam are small no special and yet practical system can be adopted for this soil. Soil tests should be made, however, and limestone or phosphate or potash fertilizers should be applied as needed. A crop rotation that provides a green-manure crop every four or five years will probably maintain enough organic matter and satisfactory soil tilth.

Elburn silt loam (198)

Elburn silt loam is a dark soil developed under prairie vegetation from 40 to 50 inches of silty loess material on calcareous till of sandy loam texture. It differs from Flanagan silt loam by occurring on areas with less slope and by being underlain by coarser till through which water passes more easily.

Soil profile. The surface horizon is a dark-brown silt loam 8 to 10 inches thick. It is high in organic matter and nitrogen, low to medium in available

phosphorus, and medium acid. The subsurface is 6 to 8 inches thick and is a dark grayish-brown silt loam. The subsoil is a grayish-brown silty clay loam mottled with yellowish-brown. Several inches of silty material lie beneath the subsoil, below which is glacial till. The upper few inches of the till are usually leached to a mottled sticky gravelly clay loam, while the lower till is calcareous and of a sandy loam texture.

Use and management. For maximum crop production on Elburn silt loam, the soil usually needs to be drained. It drains well when tiled and is a productive soil when properly treated. After being drained, the soil should be tested and limestone and phosphate or potash fertilizers applied as needed. A rotation of crops should be adopted that will provide a legume green-manure crop once every four years. Such a rotation will maintain the nitrogen, organic matter, and good tilth of this soil.

Plano silt loam (199)

Plano silt loam is a dark soil developed under prairie vegetation from 40 to 50 inches of silty loess material on calcareous till of sandy loam texture. It differs from Catlin silt loam in two ways: it occurs on areas that slope less, and it is underlain by coarser till which is more permeable to water.

Soil profile. The surface is a brown to light-brown silt loam 6 to 9 inches thick, moderately high in organic matter and nitrogen, and medium acid. It is low in available phosphorus and medium to high in available potassium. The subsurface is a yellowish-brown silt loam 6 to 8 inches thick. The subsoil is a yellowish-brown silty clay loam. Beneath the subsoil is a layer of silty material several inches thick, below which lies glacial till. The upper 10 to 15 inches of the till is usually a noncalcareous brown sticky gravelly clay loam, while the lower till is calcareous and of a sandy loam texture.

Use and management. Plano silt loam is usually well enough drained to make tile unnecessary. Erosion is a problem on slopes greater than 2 or 3 percent but can be controlled rather easily by good farming practices. These practices especially include testing the soil, applying limestone and phosphate and potash fertilizers as needed, and adopting a crop rotation that provides a legume-grass green-manure crop at least once every four years for plowing under.

Contour farming and strip cropping should be used on slopes that are greater than 2 or 3 percent and more than about 200 feet long. Grass waterways help to keep water from cutting channels in existing hillside drainages. Terraces may be used for breaking up long slopes; but before terracing, well-grassed outlets should first be constructed.

This soil is especially suited to the growing of small grains, alfalfa, and other legumes and grasses.

Thorp silt loam (206)

Thorp silt loam is a medium-dark soil formed from silty outwash or thin loess on coarse outwash or till. It has developed under weedy prairie vegetation and occurs on nearly level to depressional areas. Thorp occupies a total area of only about 1,300 acres in Kendall county. It is important to recognize this soil, however, because it is hard to drain and often forms wet spots. It differs

from Knight silt loam in that the surface is less dark and the heavy subsoil is nearer the surface.

Soil profile. The surface horizon of Thorp is a brown to grayish-brown silt loam 6 to 8 inches thick, medium in organic matter and nitrogen, and medium acid. The subsurface is a brownish-gray silt loam often mottled with rusty brown. The subsoil begins at a depth of 15 to 18 inches. It is a mixed gray, brownish-gray, and yellowish-brown plastic clay loam or clay. Layers of silt, sand, and gravel occur below 35 or 40 inches.

Use and management. Tile draw slowly in Thorp silt loam, and often it is difficult to establish surface drainage because of the low-lying position of many areas. As soon as there is satisfactory drainage, enough limestone should be applied to correct acidity. Then it will be possible to grow sweet clover, which tends to loosen the soil and improve underdrainage. When the clover is turned under, it will also supply fresh organic matter and add more nitrogen to the soil. Heavy applications of manure will also supply nitrogen and organic matter and will contribute small amounts of available phosphorus and potassium.

This soil, because of its rather unfavorable physical condition, is not highly productive. Under good management, however, small grains, soybeans, and clovers are likely to produce satisfactory yields, and in favorable seasons corn usually does well. Alfalfa is a doubtful crop on this soil.

Sexton silt loam (208)

Sexton silt loam is a light-colored soil formed from silty outwash or thin loess on coarse-textured outwash or permeable till. A minor type, it developed under forest vegetation and occupies nearly level areas or slight depressions.

Soil profile. The surface horizon is a gray or light brownish-gray silt loam 5 or 6 inches thick. It is low in organic matter, nitrogen, and available phosphorus, and is medium acid. In uncultivated forest areas it is grayish brown in color and only 2 or 3 inches thick. The subsurface is a light-gray silt loam. The subsoil is a mottled gray, sticky, silty clay. In Kendall county some areas have course, sandy, gravelly, water-deposited material beneath the subsoil while other areas are underlain by till of loam or sandy loam texture.

Use and management. Water moves but slowly through the subsoil of Sexton silt loam, and tile do not draw satisfactorily. Furrows and surface ditches may be the best solution to the drainage problem. Those areas underlain by coarse-textured material may be drained by digging or boring a hole through the heavy subsoil into the underlying permeable substrata. As soon as drainage is improved, limestone and phosphate should be applied in amounts indicated by the soil tests as needed. This will make it possible to grow sweet clover, which in turn tends to loosen the soil and further improve underdrainage. When turned under, the sweet clover will add nitrogen and fresh organic matter. Heavy applications of manure also supply organic matter, nitrogen, and small amounts of phosphorus and potassium.

This soil is not productive. Under good management, however, small grains, soybeans, and some of the clovers will produce fair yields. Alfalfa is a doubtful crop on this soil. Uncleared areas probably should remain in trees but areas that are cleared, drained, and fertilized, should produce fairly good grass.

Millbrook silt loam (219)

Millbrook silt loam is a moderately dark soil formed from silty outwash or thin loess on coarse outwash. It developed under a combination of trees and grass and is intermediate in properties between Brenton and Vance. It is a very minor type in Kendall county.

Soil profile. The surface horizon is a grayish-brown silt loam 6 to 8 inches thick. It is medium in organic matter and nitrogen, medium acid, and low in available phosphorus. The subsurface is a brownish-gray silt loam. The subsoil is a mottled brownish-gray to yellowish-gray heavy silty clay loam or clay loam. Beneath the subsoil are water-deposited silts, sands, and gravels to a depth of many feet.

Use and management. Drainage characteristics and fertilizer requirements of this soil are similar to those of Virgil silt loam and treatment and management should be similar. (See page 27.)

Plattville silt loam, deep phase (220)

Plattville silt loam, deep phase, is a dark soil developed from 3 or 4 feet of loess or silty wash together with till or outwash of loam texture on limestone bedrock. It occurs mostly in one large area east of the town of Lisbon.

Soil profile. The surface horizon is a brown to dark-brown silt loam 8 to 10 inches thick. It is high in organic matter and nitrogen, medium acid, and low to medium in available phosphorus. The subsurface is a brown to dark grayish-brown silt loam. The subsoil is a mottled dark-gray or brownish-gray silty clay loam. Beneath the subsoil and varying from 3 to 4 feet below the surface is level-bedded bedrock limestone.

Use and management. Plattville silt loam, deep phase, is a fairly productive soil when well managed. The subsoil is permeable to water, and tile draw well. Erosion is a problem on slopes greater than 2 or 3 percent. The management program should be pointed toward increasing productivity and reducing erosion on the slopes. Fortunately the increased crop growth from a well-planned management program not only increases crop yields but helps slow down erosion. On long slopes, erosion can be further reduced by contour farming, by strip cropping, and by terracing. Outlets should be constructed and well sodded before the terraces are built.

Saybrook silt loam, rolling phase (221)

Saybrook silt loam, rolling phase, is a dark soil formed from a thin blanket of silty material on permeable calcareous glacial till of loam texture. It includes the rolling portions of Saybrook silt loam and is similar to it except that its profile is thinner and more yellowish. The thinness of the profile varies according to the amount of erosion that has taken place.

Soil profile. The surface horizon is a light-brown silt loam, often slightly sandy or pebbly. It is medium in nitrogen and organic matter and medium to slightly acid. This horizon is absent on the more severely eroded areas. The subsurface is a yellowish-brown silt loam, often pebbly and slightly sandy. The subsoil is a medium-compact and slightly plastic pebbly silty clay loam. In a

Sloping areas such as this one of Saybrook silt loam, rolling phase, should not be farmed intensively to cultivated crops. A long rotation that includes plenty of legume-grass pasture is recommended. **Fig. 8**

few small areas where erosion has been active the underlying calcareous glacial till is exposed.

Use and management. The major problem in the management of Saybrook silt loam, rolling phase, is the control of erosion, though erosion is not so harmful on this soil as on Elliott, Swygert, and Clarence. Loss of the silty loess blanket reduces the agricultural value of Saybrook and forces a change in its use. It is therefore important that erosion be checked before much of the silty blanket has been removed, for this silty material forms a much better soil than does the underlying glacial till.

This soil should be thoroughly tested, and limestone and fertilizer applied as called for by the tests. This will make vigorous vegetation possible, which is essential for erosion control. Fall-plowing should be avoided, and all tillage should be on the contour. Grass waterways should be constructed, and as much vegetative material as possible left on the surface for fall, winter, and early spring protection. When corn is grown and the stalks are not already well flattened by the picker, rolling them down at right angles to the slope will reduce erosion.

Varna silt loam (223)

Varna silt loam is a medium-dark soil formed from thin loess on compact calcareous till that is moderately slowly permeable to water. It has developed on strongly sloping land under prairie vegetation and usually is associated with Elliott silt loam.

Soil profile. The profile of Varna silt loam varies, particularly in thickness, because of the different amounts of soil material that have been lost by erosion. The following description applies to areas where there has been little loss of soil material.

The surface horizon is a brown to light-brown silt loam 4 to 6 inches thick, medium in organic matter and nitrogen, medium acid, and low in available phosphorus. The subsurface is a yellowish-brown silt loam. At 8 to 12 inches it grades into the subsoil, which is a yellowish-brown medium-plastic silty clay loam. Below a depth of 25 to 30 inches the till material is identical with that under Elliott silt loam (see page 29).

Use and management. Surface runoff on Varna silt loam is very rapid. To avoid erosion, this soil type should be cropped as little as possible. When manured and limed, it makes fairly good permanent hay and pasture land unless erosion has removed all of the silty loess cover.

If it becomes necessary to crop areas of Varna, all plowing and cultivating should be done on the contour. A rotation of crops should be adopted which includes as little corn or other cultivated crops and as much small grain, hay, and pasture crops as possible. Such a rotation will provide good winter cover. Fall plowing should be strictly avoided.

The full value from barnyard manure is likely to be realized only if the acidity of the soil has been corrected. In order to grow sweet clover, an application of limestone is necessary unless erosion has been so severe that the limey glacial till has become exposed.

How to use areas that are eroded so severely that the unproductive subsoil or glacial till is exposed is a difficult problem, and no satisfactory solution has been found.

Strawn silt loam (224)

Strawn silt loam may be thought of as strongly sloping Miami silt loam described on page 17. It is a minor type in Kendall county, occupying a total area of about 1,400 acres. It occurs in association with both Miami silt loam and Miami silt loam, rolling phase.

Soil profile. The profile of Strawn silt loam varies, particularly in thickness, because of the different amounts of erosion from place to place. The following description applies to areas where there has been little loss of soil material by recent erosion.

The surface horizon is a grayish-yellow light silt loam about 6 inches thick. It is low in nitrogen and organic matter and medium acid. The subsurface is a grayish-yellow silt loam, and the subsoil is a yellow or brownish-yellow silty clay loam with some pebbles. The subsoil is usually encountered at a depth of 10 to 14 inches. Beneath the subsoil is permeable calcareous glacial till of loam texture. Sand pockets or lenses of silt and sand are common in the till.

Use and management. Strawn silt loam should be kept in permanent pasture or meadow. If tilled, erosion soon seriously reduces its agricultural value but does not completely destroy it as it does soils underlain by the slowly permeable glacial tills. The soil tests should be made and limestone and fertilizer applied in amounts called for by the tests. The soil should then be seeded to grass and legumes and protected by controlled grazing.

Eylar silt loam (228)

Eylar silt loam is a light-colored soil formed from thin loess on compact plastic calcareous glacial till. It occurs along Aux Sable creek on nearly level to moderately sloping areas in association with both Clarence and Swygert soils.

Soil profile. Some areas of Eylar silt loam have lost a large amount of soil material by erosion. The following description applies to this type in portions of cultivated fields where very little or no erosion has occurred.

The surface horizon is a yellowish-gray silt loam 4 to 6 inches thick. It is low in organic matter and nitrogen and low in available phosphorus. The subsurface is a yellowish-brown to yellowish-gray silt loam. The subsoil, which begins at a depth of 12 to 16 inches, is a mixed gray, dark brownish-gray, and pale-yellow clay which is compact and plastic. Below a depth of 25 to 30 inches is heavy, plastic calcareous glacial till of clay or silty clay texture.

Use and management. Eylar silt loam is not a productive soil. The slow underdrainage and strong tendency to erode, even on gentle slopes, together with its rather low natural productivity, make this soil difficult to manage. It is better adapted to wheat than to corn, but is best used as permanent pasture and meadow.

Eylar should be tested for acidity, available phosphorus, and potassium, and any deficiencies shown by the tests should be corrected. Clovers may then be grown either in rotation or in permanent pasture or meadow. Areas that slope more than 2 to 3 percent should not be cultivated but kept in permanent grass.

Monee silt loam (229)

Monee silt loam is a medium-dark soil formed from a thin deposit of loess on calcareous glacial till that is heavy and plastic. This type has developed on nearly level or slightly depressional areas under weed and grass vegetation. It occurs as small patches in the heavy till regions and is a very minor type in Kendall county.

Soil profile. The surface horizon of Monee silt loam is a grayish-brown to dark-gray silt loam to silty clay loam about 3 to 6 inches thick. It is medium-low in organic matter and nitrogen and medium acid. The subsurface varies from 0 to 6 inches in thickness. Where present, it is usually a gray to dark-gray silt loam. The subsoil, which begins at a depth varying from 6 to 20 inches, is a pale brownish-gray to olive-brown plastic clay and is frequently mottled with pale yellow or with rusty brown. Beneath the subsoil lies heavy, plastic calcareous till. This till is the same as that under Clarence silt loam to silty clay loam, described on page 32.

Use and management. Monee silt loam is a poor soil, similar in many respects to the nearly level portions of Eylar silt loam. The physical limitations are such that expensive treatment is not justified. The productive level will remain low regardless of any present-known treatment. Small grains and soybeans produce fair yields in favorable years. The growing of sweet clover is recommended, though some limestone and possibly a phosphate fertilizer will need to be applied before sweet clover can be grown satisfactorily.

Surface drainage can be provided by open ditches or surface inlets to tile, but water moves into and through the subsoil and underlying glacial till so slowly that the soil is cold and wet. Plant roots do not readily penetrate the subsoil. Where the combined surface and subsurface horizons are only 6 to 8 inches thick, the feeding space for plants and the supply of available soil moisture are limited.

Rowe clay loam to clay (230)

Rowe clay loam to clay is a dark soil formed from local deposits of heavy sediments on very plastic calcareous glacial till or heavy lake-bed clay. This type has developed under swampy weed-and-grass vegetation, mainly on areas that are nearly level or somewhat lower than surrounding soils.

Rowe is somewhat variable. The depressional areas, with their grayish surface, resemble Monee silt loam and may be mistaken for it, but they are somewhat more productive. Some areas with a black surface resemble Bryce clay loam to clay. Others with a very heavy surface and thick local deposit of sediment resemble Drummer clay. A few areas are covered by silty sediment recently washed from adjacent slopes of silt loam. These and other minor variations are not shown on the soil map.

Soil profile. The surface horizon varies from a very dark-gray to grayish-black silty clay loam to clay. It is 6 to 8 inches thick, medium to high in organic matter and nitrogen, and slightly acid to neutral. The subsurface is difficult to distinguish as a separate horizon, but is usually a dark-gray heavy silty clay loam to clay. At a depth of 15 to 18 inches it grades into a dark-gray or olive-gray plastic clay which is mottled with yellowish gray. Below a depth of 30 to 35 inches is sometimes a layer of looser material several inches thick. Beneath this material lies heavy, plastic calcareous till or lake-bed clay, like that found under Clarence silt loam to silty clay loam and Monee silt loam (pages 32 and 45).

Use and management. The heavy nature of Rowe clay loam to clay makes it necessary to provide surface drainage or surface inlets to the tiling system. Without surface inlets, tile do not draw fast enough to be effective. Great care must be used not to cultivate this soil when it is too wet. It should be fall-plowed; otherwise spring work is likely to be delayed too long.

Tests for acidity and for available phosphorus and potassium are advised even though this soil is usually not acid, or only slightly so, and is moderately supplied with available phosphorus and potassium. Crop yields are limited by the physical condition of the soil rather than by deficiencies of plant nutrients.

This is one of the soils in the state that demands skilful farming if satisfactory yields are to be obtained and a poor physical condition avoided. Continued growing of shallow-rooted crops, such as corn and soybeans, results in the development of a compacted layer below the surface soil. This condition is very unfavorable to plant growth. It is best corrected by growing and plowing under stand-over legumes and grasses.

Ashkum clay loam to silty clay loam (232)

Ashkum clay loam to silty clay loam is a dark soil formed from thin local wash on compact calcareous glacial till of silty clay loam texture. It has developed on nearly level to very gently sloping areas under heavy marsh-grass vegetation. It occurs mainly on the Minooka moraine in association with Elliott and Varna soils.

Soil profile. The surface horizon of Ashkum is a dark-brown to black clay loam to silty clay loam 8 to 15 inches thick. It is high in organic matter and nitrogen and neutral to slightly acid. The subsurface is seldom a definite horizon but usually changes gradually from the surface soil to the subsoil. The subsoil, which begins at a depth of 15 to 18

inches, is a mixed grayish-brown and yellowish-gray plastic clay loam with yellow spots. Beneath the subsoil usually is silty or loamy sediment several inches thick, below which lies compact calcareous till. This underlying till is the same as that found under Elliott silt loam (see page 29).

Use and management. Ashkum clay loam to silty clay loam is a moderately productive soil (see Table 1). The major problems in its management are drainage and maintenance of good physical condition. Both surface and underdrainage are moderately slow. Tile draw but not so freely as in a more open soil. The tile should be laid not more than 4 rods apart and as shallow as is safe. Open ditches or furrows to supplement the tile may be used to advantage where there is an outlet available for surface drainage.

This soil can be kept in good physical condition by the use of a good rotation, including deep-rooting legumes, together with tillage practices suited to a heavy soil. Working this soil when it is too wet puts it in a poor physical condition that persists through at least one winter. Plowing in the fall is advisable, as it improves the physical condition of the soil and lessens the risk of having to plant late in the spring.

The soil tests should be made, and if limestone is needed for the growing of legumes, it should be applied. If the tests show that available phosphorus is low, either superphosphate or rock phosphate will give good crop increases. Where wheat is grown, it probably will be worth while to apply superphosphate. If both available phosphorus and potassium are only slightly deficient, the small amounts needed may be added either in a mixed fertilizer such as 0-20-20 or separately as superphosphate and potash.

Bryce clay loam to clay (235)

Bryce clay loam to clay is a dark soil formed from heavy local sediment on compact, plastic calcareous till of silty clay texture. It occurs on nearly level to gently sloping areas in association with Swygert silt loam to silty clay loam. In both physical properties and agricultural value it is intermediate between Rowe clay loam to clay and Ashkum clay loam to silty clay loam.

Soil profile. The surface horizon of this type ranges from a black clay loam to a very dark-brown silty clay loam. It is 8 to 12 inches thick, high in organic matter and nitrogen, and neutral to slightly acid. The subsurface is a dark grayish-brown to black clay loam or clay. It seldom occurs as a well-defined horizon but changes gradually from the surface to the subsoil. The subsoil, which begins at a depth of 16 to 18 inches, is a dark-gray plastic clay mottled with pale yellow and dull rusty brown. Sometimes there is a thin layer of silty clay loam sediment between the subsoil and the underlying heavy, plastic calcareous till. The underlying till is the same as that under Swygert silt loam to silty clay loam described under that soil on pages 24 and 25.

Use and management. Drainage and the maintenance of good tilth are the first problems in the management of this soil. Tile are only moderately effective because water moves so slowly through the subsoil and underlying glacial till. Surface drainage is slow on the more level portions of the type. If a tiling system is installed, surface inlets might well supplement the underdrainage system.

Bryce clay loam to clay is good corn soil but hard to drain and heavy to work. Wise use of legumes and crop residues will improve its tilth. For satisfactory drainage, open ditches or surface inlets into tile systems are needed. Fig. 9

It is important to keep this soil in as good tilth as possible; otherwise a good seedbed becomes more and more difficult to prepare. Good tilth can be maintained by supplying plenty of fresh organic matter by growing deep-rooting legumes and turning under crop residues, and by working the soil only when it is neither too wet nor too dry.

If the soil tests show any acidity, the required amount of limestone should be applied so that clovers may be grown. If available phosphorus is very deficient, rock phosphate will probably give satisfactory crop increases. If the phosphorus test is medium, superphosphate would probably be better on this soil than rock phosphate. If the content of both phosphorus and potassium is medium, these materials may be added in a mixed fertilizer, such as 0-20-20, or separately as superphosphate and potash.

Drummer clay (238)[1]

Drummer clay is a dark soil formed from heavy local water-deposited sediments. It has developed only in depressions under a covering of coarse grass and sedge. It is a minor type in Kendall county.

[1] Subsequent to the preparation of the Kendall county soil map the name Drummer clay was changed to Rantoul silty clay.

Soil profile. There is little horizon development in Drummer clay — no definite separation into surface, subsurface, and subsoil can be made. The upper 15 to 20 inches of the profile is black or grayish-black heavy clay loam or clay. Below this it grades gradually into dark gray, with pale-yellow and rusty-brown spots. The entire profile is heavy and

plastic. Below a depth of about 30 inches the clayey sediment is usually somewhat less plastic and at about 45 inches glacial till or glacial outwash is found.

Use and management. There is no surface drainage on Drummer clay, and underdrainage is slow. Tile do not draw readily. After heavy rains, surface runoff from surrounding higher land collects and often drowns the crops.

Drummer clay is difficult to farm profitably. When undrained, these areas remain wet for a long time after the adjacent soils are ready to be cultivated.

Surface drainage can sometimes be provided by open ditches. If this method is impractical, a catch basin or open tile inlet is often advisable. When this soil is well drained, it is best adapted to corn and sweet clover. A potash fertilizer may be needed in order to get satisfactory corn yields. Small grains tend to grow very rank and lodge.

Areas of Drummer clay that cannot be drained and are left in weeds and shrubs can be useful as a refuge for wildlife.

Plattville silt loam, rolling phase (240)

Plattville silt loam, rolling phase, is a moderately dark soil developed from 3 to 4 feet of silty loess and loamy till or outwash on limestone bedrock. It occurs on slopes of 4 to 8 percent in association with Plattville silt loam, deep phase. It is a minor type in Kendall county.

Soil profile. Where not severely eroded, the surface horizon is a brown to light-brown silt loam 6 to 8 inches thick. It is medium in organic matter and nitrogen, medium acid, and low in available phosphorus. The subsurface is a light-brown to yellowish-brown silt loam. The subsoil is a yellowish-brown silty clay loam with some sand and a few pebbles, especially in the lower part. Beneath the subsoil at a depth of 3 to 4 feet is limestone bedrock. In a few places bedrock is less deep. If it is as shallow as 30 inches, these places will be more drouthy and less productive.

Use and management. If cultivated, Plattville silt loam, rolling phase, is subject to serious erosion. It is good hay and pastureland if properly treated, and much of the type should be used for these purposes. The fields under cultivation should be farmed on the contour, and long slopes should be strip cropped. Soil tests should be made and limestone and fertilizers applied as needed because vigorous vegetation helps reduce erosion.

Kendall silt loam (242)

Kendall silt loam is a light-colored soil formed from 40 to 50 inches of loess on calcareous till of sandy loam texture. It developed under deciduous hardwood forest and occurs on nearly level topography. It is a very minor type in Kendall county.

Soil profile. The surface horizon is a dark-gray to brownish-gray silt loam 5 or 6 inches thick. It is low in organic matter, nitrogen, and available phosphorus, and is medium acid. The subsurface is a gray silt loam. The subsoil is a mottled brownish-gray silty clay loam. Beneath the subsoil is silt loam material several inches thick, and below this silt loam lies glacial till. The upper few inches of the till is usually leached to a mottled sticky gravelly clay loam, whereas the lower till is calcareous and of a sandy loam texture.

Use and management. Kendall silt loam usually needs drainage for satisfactory farming. It drains fairly well when tiled but is not a highly productive soil even when fully treated. After being drained it should be tested and limestone, phosphate, and potash applied as needed. If good crops of corn are to be grown, organic matter and nitrogen will have to be maintained. This can be done by adopting a rotation that includes a legume green-manure crop every three years. When properly treated and not overgrazed, this soil makes good pastureland. When no treatment is given, it probably should remain in trees.

St. Charles silt loam (243)

St. Charles silt loam is a light-colored soil that developed under forest vegetation from 40 to 50 inches of loess on calcareous till of sandy loam texture. It occurs on gently sloping areas adjacent to Big Rock and Little Rock creeks.

Soil profile. The surface horizon is a yellowish-gray silt loam 5 or 6 inches thick. It is low in organic matter, nitrogen, and available phosphorus. In uncleared woods it is dark grayish-brown and only about 1 or 2 inches thick. The subsurface is a brownish-yellow silt loam. The subsoil is a yellowish-brown silty clay loam. Beneath the subsoil is 12 to 15 inches of silty material below which lies glacial till. The upper few inches of the till is leached and weathered to a reddish-brown sticky gravelly clay loam. The lower till is calcareous and of a sandy loam texture.

Use and management. St. Charles silt loam usually does not need tile drainage. Erosion is harmful in cultivated fields on slopes greater than 2 or 3 percent. Soil tests should be made and limestone, phosphate, and potash should be applied as needed to grow good clovers or alfalfa. A rotation of crops should be adopted that provides a legume green-manure crop at least once every four years. On slopes of 2 percent or more all row crops should be planted on the contour. Long slopes, 250 feet or longer, should be broken up by terraces as well as farmed on the contour if crops of corn and soybeans are to be grown regularly. The more protection against erosion that is provided, the more clean-cultivated row crops that can be grown in a rotation without serious harm from erosion.

GROUPING OF SOILS OF KENDALL COUNTY

Fifty-one soil types were mapped in Kendall county. Anyone who needs to become familiar with all of them will find it helpful to get an understanding of the differences between the various types. Table 6 and Fig. 10, in addition to Fig. 3 on page 6, will help make the soil relationships clear.

Terrace and upland soils. The terrace and upland soils are shown in Fig. 10 in three major groups numbered 1, 2, and 3.

The soils of Group 1 have developed from loess only or from a combination of loess and glacial till. In either case these soils are very strongly influenced by the kind of till beneath them. In Area 1A, (in Fig. 10) this underlying till is a sandy loam; in 1B it is a loam or silt loam; and in 1C it is a silty clay loam. In 1D the underlying material is drift, either till or lake-bed sediments, of a silty clay to clay texture. These till and drift materials of varying textures not only influence the characteristics of

Table 6. — KENDALL COUNTY SOILS

Grouped According to Underlying Materials, Subsoil Permeability, Native Vegetation, and Slope

Soil group	Underlying materials	Subsoil permeability	Native vegetation	Soil type number[a] and predominant slope: Depressional to nearly level	Gently to moderately sloping	Strongly sloping to steep
			TERRACE and UPLAND			
1A	Sandy loam till	Moderate	Prairie	191, 197, 198, 206	199	155
			Transition	104	105	....
			Forest	242	243	25, 224
1B	Loam or silt loam till	Moderate	Prairie	59, 67, 152, 206, 238	145, 154, 171, 221	60
			Transition	62	57, 62	57
			Forest	208	24, 27	25, 224
1C	Silty clay loam till	Moderately slow	Prairie	232, 238	146, 193	223
			Forest	....	23, 194	....
1D	Silty clay to clay drift	Slow	Prairie	229, 230, 235, 238	91, 96, 147	....
			Forest	228	228	....
2A	Sandy and gravelly outwash	Moderately rapid	Prairie	148, 151, 191, 197, 206	88, 155	155
			Forest	158	99	25
2B	Silt loam to sandy loam outwash	Moderate	Prairie	67, 152, 206, 238	148, 149, 155	155
			Transition	....	219	....
			Forest	158, 208	158	25, 99
3	Limestone bedrock	Moderate	Prairie	220	220, 240	240
			BOTTOMLAND			
4	Bottomland soils	Moderate	Prairie	73, 82	......	....

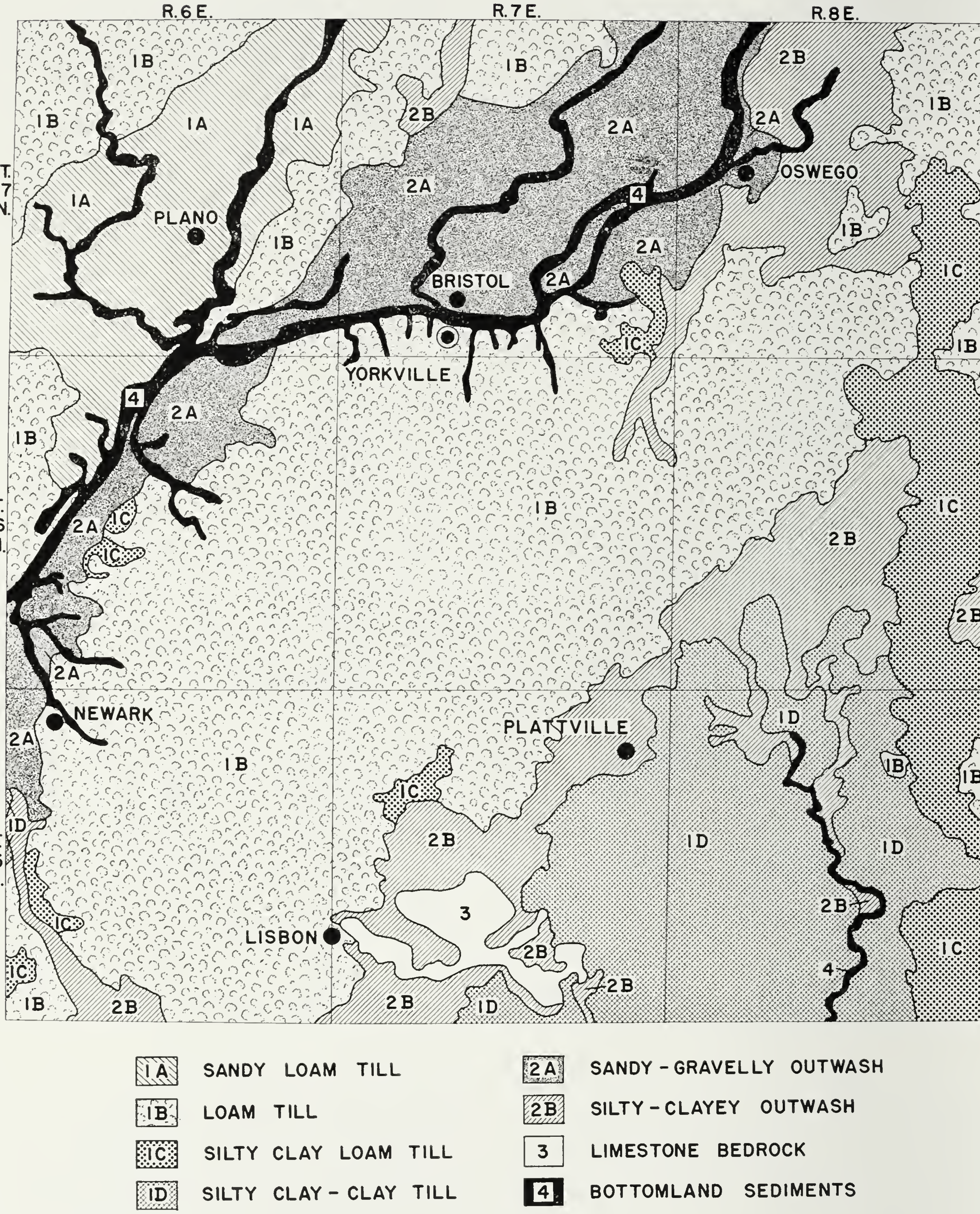
[a] Type 103 is not included in this table because it does not fit into any of the categories.

the soils developed in association with them, but they also strongly influence the ease with which such soils can be drained.

The soils of Group 2 have developed from a combination of loess and outwash. In 2A the outwash is mostly coarse sands and gravels, in 2B it is mainly medium to fine silts and silty clay loams. The large areas of Proctor soils in Area 2A are apt to be slightly drouthy, whereas the large areas of Drummer soils in Area 2B need artificial drainage.

The soils of Group 3 are underlain by bedrock limestone at depths varying from about 2½ feet to about 4 feet.

Bottomland soils. The bottomland soils are shown as Group 4 in Fig. 10 on the next page. They are formed from recently deposited sediments and do not have developed profiles.



An important feature to know about a soil is whether it is so tight that it does not underdrain freely or so open that it underdrains too freely and consequently is drouthy. The above map gives this information for Kendall county.

Soils in Areas 1A, 1B, 1C, and 1D are developed on glacial till. They are lettered here in order of *decreasing* permeability and effectiveness of tile.

Soils in Areas 2A and 2B are developed on glacial outwash and are also lettered in order of *decreasing* permeability.

Soils in Area 3 are underlain by level-bedded limestone at a depth of 3 to 4 feet.

The soils in Area 4 are developed from bottomland sediments. Fig. 10

SUMMARY OF CHARACTERISTICS OF KENDALL COUNTY SOILS

A summary of the agriculturally more significant characteristics of the soil types shown on the soil map is given in Table 7. The information in this table is necessarily general and should not be taken to mean that every farm or field of a given soil type exhibits exactly the same characteristics as here indicated. As already pointed out, productivity varies within areas of the same type because of differences in past management. These variations in productivity cannot always be detected by the soil surveyor but they are known to the farmer operating the land. By supplementing the *use-and-management* suggestions with his special knowledge, an operator should be able to plan a good soil-management and cropping program for each of the soils on his farm.

The column in Table 7 headed "Tendency to erode" does not indicate the amount of erosion that has already taken place, nor the harmfulness of erosion on the various soils. It indicates only the *tendency* of each soil to erode. Soils with good parent materials which are deep, such as Saybrook, are less injured by erosion than are soils with poor parent materials near the surface, such as Clarence. Saybrook is injured by erosion, but the removal of the surface horizon does not completely destroy its capacity to produce crops. The removal of the surface soil from Clarence and the other slowly permeable till soils seriously and permanently reduces their agricultural value.

Table 7. — KENDALL COUNTY SOILS: Summary of Characteristics and Properties

Type No.	Type name	See page[a]	Topography[b]	Permeability of subsoil[c]	Organic matter	Workability[d]	Tendency to erode[e]	Resistance to drouth
23	Blount silt loam	15	Gently sloping	Moderately slow	Low	Good	Moderate	Fair
24	Miami silt loam	17	Gently sloping	Moderate	Low	Good	Moderate	Fair to good
25	Hennepin gravelly loam	18	Strongly sloping to steep	Moderate	Low	.....	Great	......
27	Miami silt loam, rolling phase	19	Moderately sloping	Moderate	Low	Good	Moderate to great	Fair to good
57	Herbert silt loam, rolling phase	19	Moderately sloping	Moderate	Medium	Good	Moderate to great	Good
59	Lisbon silt loam	20	Very gently sloping	Moderate	High	Good	Slight	Good
60	LaRose silt loam	20	Strongly sloping	Moderate	Medium high	Good	Great	Fair to good
62	Herbert silt loam	21	Gently sloping	Moderate	Medium	Good	Moderate	Good
67	Harpster clay loam	21	Nearly level to depressional	Moderate	High	Fair	None	Good
73	Huntsville loam, bottom	22	Nearly level	Moderate	High	Good	None	Good
82	Millington loam, bottom	23	Nearly level	Moderate	High	Good	None	Good
88	Hagener loamy sand	23	Gently to moderately sloping	Very rapid	Medium low	Good	Moderate wind	Poor to fair
91	Swygert silt loam to silty clay loam	24	Very gently to gently sloping	Slow	High	Good	Moderate	Fair
96	Swygert silt loam, rolling phase	25	Moderately sloping	Slow	Medium high	Fair	Great	Fair to poor
99	Vance silt loam, rolling phase	26	Moderately sloping	Moderate	Low	Good	Moderate to great	Fair to good
103	Muck	27	Depressional	Very rapid	Very high	Good	None	Fair to good
104	Virgil silt loam	27	Nearly level	Moderate	Medium	Good	Slight	Good
105	Batavia silt loam	28	Gently to moderately sloping	Moderate	Medium	Good	Moderate	Good

(Table is concluded on next page)

Table 7. — Concluded

Type No.	Type name	See page[a]	Topography[b]	Permeability of subsoil[c]	Organic matter	Work-ability[d]	Tendency to erode[e]	Resistance to drouth
145	Saybrook silt loam	28	Gently sloping	Moderate	High	Good	Moderate	Good
146	Elliott silt loam	29	Very gently to gently sloping	Moderately slow	High	Good	Moderate	Good
147	Clarence silt loam to silty clay loam	32	Very gently to gently sloping	Very slow	Medium high	Fair	Moderate	Fair to poor
148	Proctor silt loam	33	Very gently to gently sloping	Moderate	High	Good	Slight to moderate	Good
149	Brenton silt loam	33	Nearly level to very gently sloping	Moderate	High	Good	Slight	Good
151	Ridgeville fine sandy loam	34	Nearly level to gently sloping	Moderately rapid	Medium	Good	Slight	Fair to good
152	Drummer clay loam	34	Nearly level to depressional	Moderate	High	Fair	None	Good
154	Flanagan silt loam	35	Very gently to gently sloping	Moderate	High	Good	Slight to moderate	Good
155	Proctor silt loam, rolling phase	36	Moderately sloping	Moderate	Medium high	Good	Moderate to great	Fair to good
158	Vance silt loam	36	Nearly level to gently sloping	Moderate	Low	Good	Slight to moderate	Good
171	Catlin silt loam	37	Moderately sloping	Moderate	High	Good	Moderate	Good
191	Knight silt loam	37	Depressional	Slow	High	Good	None	Fair to good
193	Elliott silt loam, rolling phase	38	Moderately sloping	Moderately slow	Medium high	Good	Great	Fair
194	Blount silt loam, rolling phase	38	Moderately sloping	Moderately slow	Low	Good	Great	Fair
197	Troxel silt loam	39	Depressional	Moderate	High	Good	None	Good
198	Elburn silt loam	39	Nearly level	Moderate	High	Good	Slight	Good
199	Plano silt loam	40	Gently to moderately sloping	Moderate	High	Good	Moderate	Good
206	Thorp silt loam	40	Nearly level to depressional	Moderately slow	Medium	Fair	None	Fair
208	Sexton silt loam	41	Nearly level to depressional	Moderately slow	Low	Fair	None	Fair
219	Millbrook silt loam	42	Nearly level to very gently sloping	Moderate	Medium	Good	Slight	Good
220	Plattville silt loam, deep phase	42	Gently to moderately sloping	Moderate	High	Good	Slight to moderate	Good to fair
221	Saybrook silt loam, rolling phase	42	Moderately sloping	Moderate	Medium high	Good	Moderate to great	Good
223	Varna silt loam	43	Strongly sloping	Moderately slow	Medium high	Good	Great	Fair
224	Strawn silt loam	44	Strongly sloping	Moderate	Low	Good	Great	Fair
228	Eylar silt loam	44	Gently to moderately sloping	Very slow	Low	Fair	Slight to moderate	Poor
229	Monee silt loam	45	Nearly level	Very slow	Medium low	Fair	None	Poor
230	Rowe clay loam to clay	46	Nearly level to depressional	Very slow	High	Fair	None	Fair
232	Ashkum clay loam to silty clay loam	46	Nearly level to depressional	Moderately slow	High	Fair	None	Good
235	Bryce clay loam to clay	47	Nearly level to depressional	Slow	High	Fair	None	Good to fair
238	Drummer clay	48	Depressional	Slow	High	Poor	None	Fair
240	Plattville silt loam, rolling phase	49	Moderately sloping	Moderate	Medium high	Good	Moderate to great	Fair
242	Kendall silt loam	49	Nearly level	Moderate	Low	Good	Slight	Good
243	St. Charles silt loam	50	Gently to moderately sloping	Moderate	Low	Good	Moderate	Good

[a] For description of soil type turn to page indicated.

[b] Topography is expressed by the following terms: *depressional*, sloping inward; *nearly level*, less than 0.5 percent slope; *very gently sloping*, 0.5 to 1.5 percent; *gently sloping*, 1.5 to 3.5 percent; *moderately sloping*, 3.5 to 7 percent; *strongly sloping*, 7 to 15 percent; *steep*, greater than 15 percent.

[c] Of the terms used, *moderate* expresses the most desirable condition. Where no subsoil is present, the terms apply to the material lying between 20 and 40 inches.

[d] *Workability* depends on texture, structure, and organic-matter content of the surface horizon, as well as on slope and drainage. An uneroded condition is assumed.

[e] *Tendency to erode* means susceptibility to water erosion when cultivated. Wind erosion is indicated only where it is a hazard.

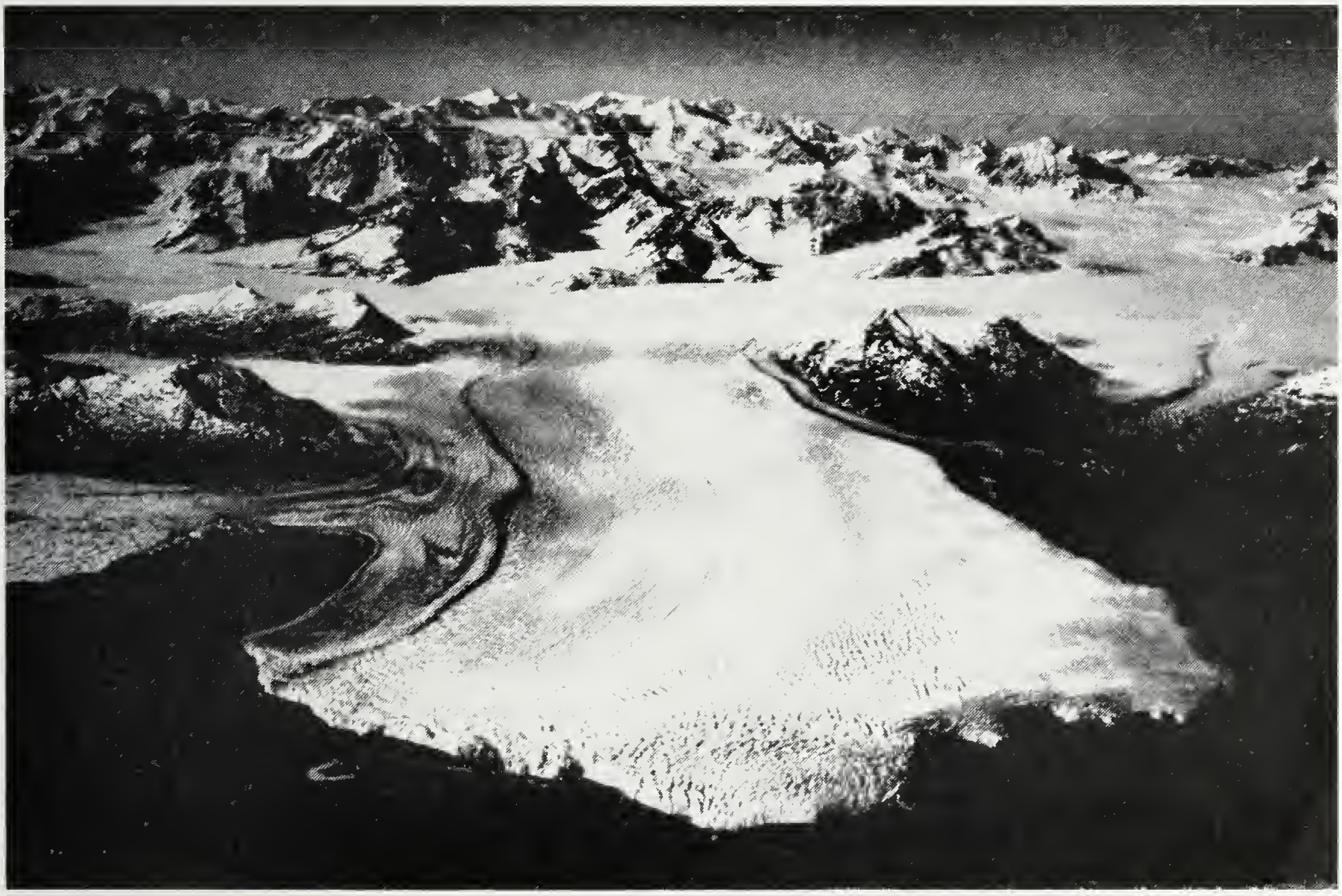
HOW KENDALL COUNTY SOILS WERE FORMED

The intelligent use and management of soils does not require a knowledge of the origin of the materials from which the soils developed nor of the processes that were active in their development. Many people, however, are interested in an explanation of facts as well as in the facts themselves. The information given here is intended for those who would like a brief statement of some of the interesting points about the development of Kendall county soils.

Origin of the soil materials. The upland and terrace soils of Kendall county have developed from materials deposited during the Glacial Epoch. The bottomland soil materials were deposited by streams during more recent times.

During the Glacial Epoch the climate alternated between long periods when it was much like our climate today and other periods of prolonged cold. In the colder periods the average temperature was so low that the snow which fell in winter did not entirely melt the following summer. As time went on huge amounts of snow and ice piled up in the northern parts of our continent. The pressures that developed in this great ice mass caused it to push outward, forming glaciers (Fig. 11).

Aided by further accumulations of



Courtesy of Bradford Washburn, Boston Museum of Science

This picture of the Columbia glacier in Alaska illustrates how glaciers form and move. Note that the small valley glaciers in the background have joined together into a large glacier in the foreground. This larger glacier is pushing into Prince William sound. It is approximately 5 miles across at its widest point and about 800 feet thick at its front. Between 200 and 250 feet of ice show above the water. The dark streaks are glacial till imbedded in the ice. This glacier is very small compared with the ice sheets that covered most of Illinois in past ages. Fig. 11

snow and ice at their margins, the glaciers advanced, moving chiefly southward until they reached a region where the climate was warm enough to melt the ice as rapidly as the glacier moved forward.

In moving across the country, the ice sheets picked up great masses of rock, gravel, sand, silt, and clay, ground them together, and carried them along. Most of these materials were deposited within a hundred miles or less of the point where they were picked up, but some were carried for hundreds of miles. The moving ice leveled off hills and filled in old valleys, often completely changing the surface features of the areas over which it passed. The mixture of materials left by a glacier is known as *glacial till,* a term which appears frequently in descriptions of soils.

The area that is now Kendall county was covered by at least two of the four major glacial advances of ice from the north, but only the last, called the Wisconsin ice sheet, had much influence on the soils of the county. The retreat, or melting back, of this glacier was not a continuous process but was often interrupted. Besides the periods when the ice advanced, there were long periods when the margins of the ice were nearly stationary. During these long, nearly stationary periods the ice melted as rapidly as it pushed forward, and the till material deposited by the melting ice piled up in the form of ridges, or moraines. The Marseilles moraine, on the south side of Fox river and approximately parallel to it, was formed in this way. Minooka ridge lying along the east boundary of Kendall county is another good example.

As the glacial ice melted, the enormous quantities of water released picked-up sediments from the glacier and carried them away from the ice sheet. These sediments were partially or completely sorted into gravels, sands, silts, and clays. Deposits of them are called *outwash.* The coarse material (gravel and sand) was deposited near the front of the glacier or carried by rapidly flowing waters into the basin of Fox river. The finer material (silt and clay) was laid down in lakes of quiet water or carried into Illinois river.

Silts left in the bottoms or on terraces of large rivers became a source of *loess.* Silty loess material covers most of the till and outwash in Kendall county. The thickness of this loess blanket on nearly level areas varies from about 4½ or 5 feet in the western part of the county to about 2 or 2½ feet in the eastern part. Where the loess is as thin as 30 inches, the underlying till or outwash becomes of major importance in the development of the soil and in determining its agricultural value.

Composition of the soil materials. The nature of many of the soils in Kendall county may depend not only on the surface materials or the profile to 40 inches but also on the materials to a depth of as much as 6 feet or more. Loess is a friable uniform silt that is well supplied with most of the plant nutrients except nitrogen. It is a very desirable soil material. Till and outwash, on the other hand, vary from coarse sand and gravel through medium-textured silt to fine clay. They may be well supplied with most of the plant nutrients or may be deficient in some. Glacial till that is made up of many different kinds of rocks and is of loam texture is about as good a parent soil material as loess. It is this kind of material, along with a loess cover, that occupies most of the central and southwestern parts of Kendall county.

Till material made up mainly of shale is high in clay, very plastic, and very

slowly permeable to water. Such till occupies a large area in the southeastern part of the county.

How the soils were developed. As soon as the parent materials — loess, till, or outwash — were deposited, they were subjected to weathering forces, and the processes of soil development began. When first deposited, the parent materials were high in lime and most of the mineral elements of plant food but very low in nitrogen. As time elapsed, the rain water, the oxygen and carbon dioxide of the air, and the products of decaying plants attacked the minerals, leaching out the free lime and changing some of the minerals into clay.

Since the forces that cause weathering are most active near the surface of the soil and less active with increasing depth, various stages of weathering occur at different depths. Thus carbonates are leached first from the surface, and it is there that the minerals are broken down most rapidly. Most of the organic matter accumulates in the surface, as is indicated by the darker color of the surface soil. The clay particles that form at or near the surface are gradually carried downward by the percolating waters to a point where they accumulate, forming a subsoil high in clay. Thus horizons, or layers, differing in physical and chemical composition gradually develop, and the parent material takes on characteristics that justify calling it a soil.

As soon as the physical and chemical forces of weathering began acting on the slowly soluble minerals, plant nutrients in available form were released. Then vegetation started spreading over the land, more slowly perhaps in the regions where the till contained more shale.

Two types of vegetation — prairie and forest — were important influences in the development of the soils of Kendall county. Where prairie grasses grew, their extensive and fibrous roots decayed in the soil, adding much organic matter and producing the dark soils of the county. Where forests grew for long periods of time, light-colored soils developed. These soils have little organic matter because leaves dropped by trees stay on the surface of the land and decay rapidly.

Drainage is another great influence on the development of soils. A high water table speeds up the decomposition of minerals but retards leaching and the decay of organic matter. Soils that were wet throughout their development are therefore characterized by a heavier surface texture, less acidity, and more organic matter than those developed under conditions of good drainage.

Not all parent materials are affected to the same extent by the weathering processes. Where they are permeable to water, a large part of the rainfall penetrates deeper into the soil and deeper leaching takes place than where the soil materials absorb water only slowly. Moreover when water penetrates slowly, more of it runs off the surface and there is more rapid loss of soil material by erosion. Thus on the slowly permeable till in Kendall county we find shallow soils that usually contain lime at a depth of only about 2 or 2½ feet; whereas on moderately permeable till and on outwash, the lime is usually as deep as 3 or 4 feet.

Variations in the soils of Kendall county, as elsewhere, thus trace back to differences in the parent materials, in the native vegetation, the drainage, and the topography, or "lay of the land."

GEOGRAPHICAL AND HISTORICAL FEATURES

Physiography and drainage. Kendall county is a region of moderately low relief. Marseilles and Minooka moraines are somewhat rolling, but there are also large areas of nearly level land. The highest point in the county is on the Marseilles moraine about 2 miles southwest of Yorkville. The altitude at this point is 800 feet above sea level. The lowest point, 550 feet above sea level, is the channel of Fox river at the west edge of the county. Drainage is largely to the west through Fox river and thence to Illinois river, although much of the central and southeastern parts of the county drain south through Aux Sable and other smaller creeks directly to the Illinois.

Climate of Kendall county. The climate of Kendall county is characteristic of that in the north-central part of the United States. There is a wide range in temperature between the extremes of winter and summer; and the rainfall, though irregularly distributed, is usually abundant, so far as the total annual amount is concerned. Rainless periods long enough to be harmful are, however, not uncommon during the growing season.

At the Aurora weather station, which is just north of the northeast corner of Kendall county, the highest temperature recorded during the twenty-five years 1926-1950 was 111° F. in July 1936, and the lowest was 24° below zero in December 1950. The mean annual temperature was 49.2°, the mean July temperature 73.6°, and the mean January temperature 24°.

The average date of the last killing frost in the spring at Aurora during these same twenty-five years was May 2, and the average date for the earliest killing frost in the fall was October 11. This gives an average frost-free growing season of 162 days. The latest recorded killing frost in the spring was May 26, 1934, while the earliest recorded killing frost in the fall was September 24 in both 1928 and 1949. The shortest growing season was 136 days in 1949, the longest was 187 days in 1940. The average growing season gives ample time to mature the crops commonly grown, although frosts occasionally catch corn and soybeans before they are fully matured.

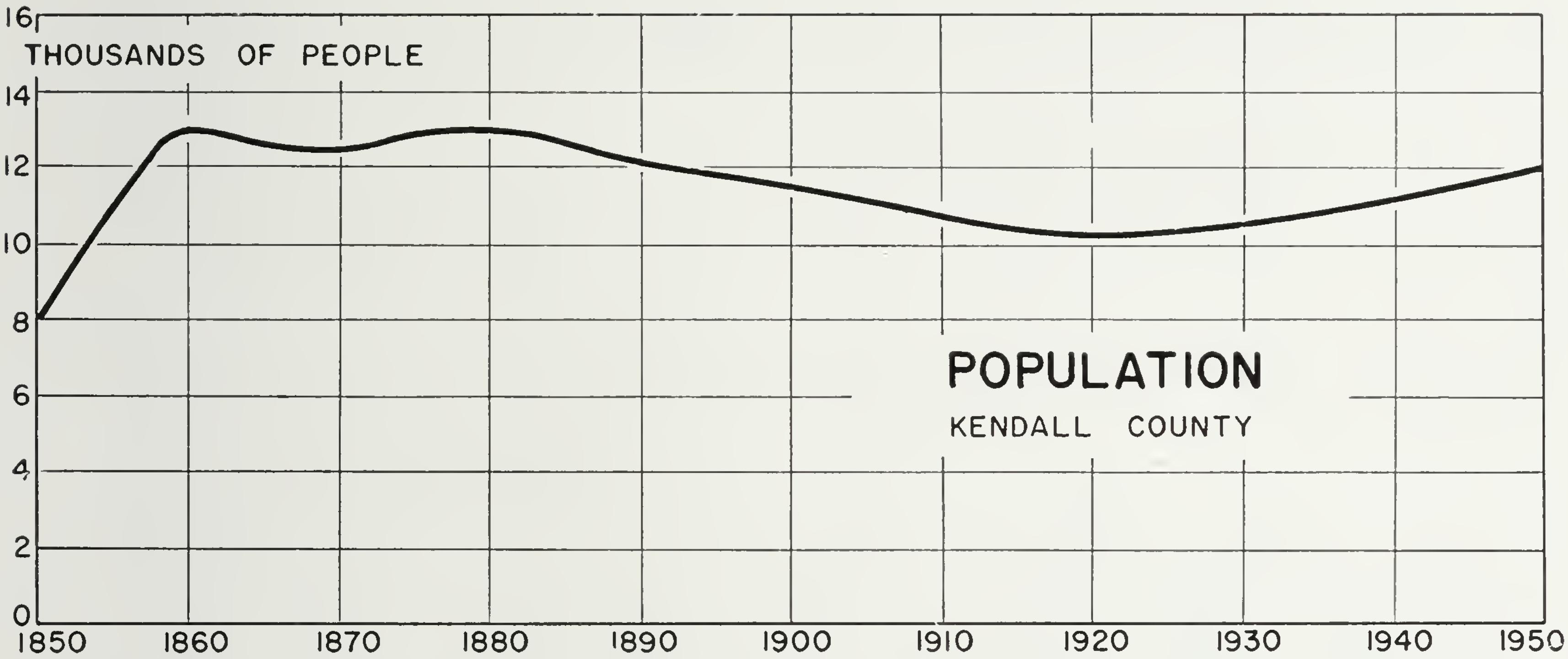
The average annual precipitation (amount of rain, and of snow and sleet in terms of rain) recorded at the Aurora station from 1926 through 1950 was 33.64 inches, ranging, however, from a low of 25.32 inches in 1944 to a high of 41.04 inches in 1935. The yearly snowfall averaged 28.3 inches.

Of much greater interest to farmers than the annual precipitation is the amount and distribution of rainfall during the growing season. From April through September the amount has ranged from 13.40 inches in 1946 to 29.56 inches in 1945 and has averaged 20.89 inches. If well distributed, this average amount would be adequate for good crops every year on most of the soils in Kendall county. However, rainless periods of 15 to 20 days or longer occur nearly every year and the effect on crop yields is sometimes serious, especially on soils that cannot absorb moisture readily or retain it well.

Important as amount and distribution of rainfall are to crops, their effect is altered by a number of other conditions, among them (1) temperature of the atmosphere and amount of evaporation taking place, (2) capacity of the soil to absorb and retain moisture, and (3) the growth stage of the crop and the reaction of the crop to drouth.

Settlement of Kendall county. The first permanent settlement in the territory that is now Kendall county was made in 1826 at Holderman's Grove in the southwestern corner of what is now Big Grove township. The county was established by legislative action in 1841 from parts of Kane and LaSalle and was named for Amos Kendall, postmaster general in the cabinet of President Andrew Jackson.

The population increased rapidly from 1830 to 1860, declined slightly until 1870, and reached a peak of 13,082 in 1880. Then came a gradual decline to 10,074 in 1920, then a gradual increase to 12,066 in 1950 (Fig. 12).



The population of Kendall county increased rapidly between 1830, two decades earlier than this graph shows, and 1860. In 1880 it reached a peak of 13,082 people, according to the U.S. Census. A gradual decline followed until about 1920, after which it steadily increased, reaching 12,066 in 1950. Fig. 12

Transportation facilities. A main line and a branch line of the Chicago, Burlington, and Quincy railroad furnish direct rail connections from the northern part of the county to Aurora and Chicago. A paved highway system and good gravel roads furnish an all-weather farm-to-market road system for all the county.

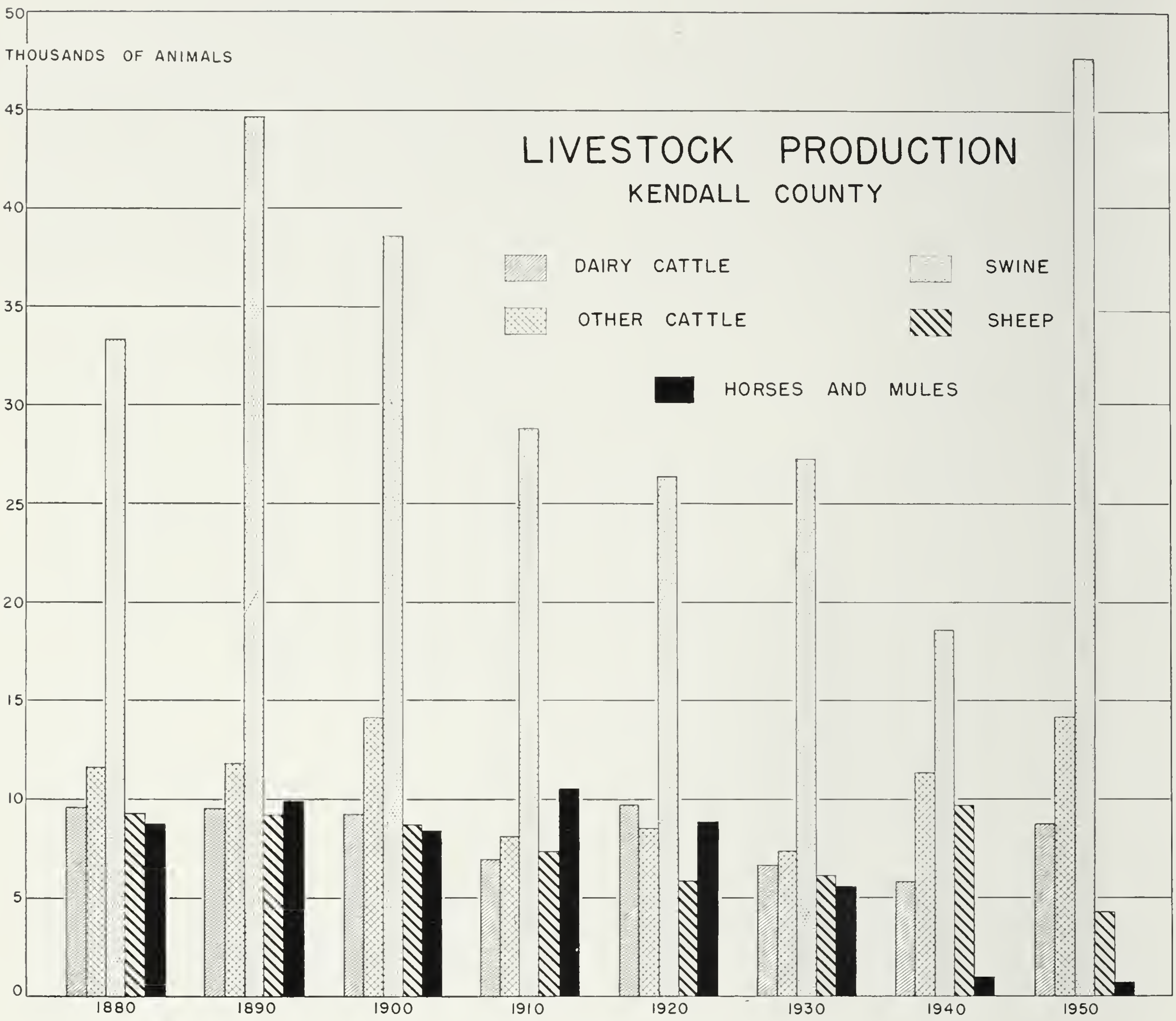
Agricultural production. Agriculture is the leading industry in Kendall county. The major portion of the county is tillable, and many of the soils, when well farmed, are productive.

Corn is the most important crop from the standpoints of acreage and value. For the six years 1943-1948 the average yearly acreages of the four chief crops were:

	Acres
Corn	78,000
Oats	45,300
Soybeans	14,800
Hay, including alfalfa	20,600

The acreage of wheat, barley, and rye is very minor but permanent pasture is important. According to the U. S. Census of Agriculture, 27,875 acres were used for pasture in 1945, including 11,090 acres of woodland pasture. There were only 432 acres of unpastured woodland at that time.

Livestock and livestock products are important in Kendall county, as shown by Fig. 13 on the next page.



The marked increase in livestock production in Kendall county between 1940 and 1950 is especially to be noted on this graph. In 1950 the number of cattle other than dairy was greater than at any other time since 1900, and swine reached an all-time high. The number of dairy cattle over the years has not changed greatly. Sheep have declined sharply since 1940. Horses and mules are now a negligible part of the livestock of the county.
Fig. 13

MEANINGS OF SOME TECHNICAL TERMS

Alluvial sediment — soil material carried by running water and left on the flood plains.

Calcareous — containing enough limestone to effervesce, or bubble, when dilute hydrochloric (muriatic) acid is poured on it.

Compact — said of soils that are difficult to penetrate, being made up of particles closely packed and sometimes weakly cemented together.

Concretions — small hard nodules, or lumps, of mixed composition, shapes, and coloring. (Limestone concretions and dark rounded pellets of iron-manganese are common.)

Depressional — a term applied to low-lying areas where there are no surface outlets for the water that accumulates or only poorly developed outlets.

Drift — *see* Glacial drift.

Friable — easily crumbled or crushed in the fingers; a desirable physical condition in soils.

Glacial drift — any materials of glacial origin, including both glacial till and glacial outwash.

Glacial till — mixed materials deposited by glacial ice and not laid down in layers and not sorted as to size.

Horizon — *see* Soil horizon.

Incoherent — said of soil material that falls apart easily or that has no cohesion.

Leached — dissolved and washed out of or down through the soil. This has happened with the more soluble materials, such as limestone.

Leguminous — a term applied to plants that have the power to fix nitrogen from the air through bacteria on their roots.

Loess — fine dust or silty material transported by the wind and deposited on the land. In the Midwest *loess* is largely of glacial origin. The grinding action of the glacial ice reduced great quantities of rocks to "rock flour." This fine material was, for the most part, deposited as bottomland sediment by glacial streams in their flood stage. Later, during dry periods, it was picked up by the wind and redeposited on the surrounding upland areas.

Manure system — a system of farming which makes use of animal manure, including litter, which is plowed down for corn in amounts equal to the dry weight of grain and roughage removed during the previous rotation.

Neutral — a term applied to soils whose reaction is neither acid nor alkaline.

Outwash, glacial outwash — sediment, often sandy and gravelly, deposited in layers in valleys or on plains by water from a melting ice sheet.

Percent slope — the slant or gradient of a slope stated in percent; for example, a 15-percent slope is a slope that drops 15 feet in 100 feet.

Plastic — said of material that is capable of being molded or modeled without breaking up; an undesirable condition, the opposite of friable.

Plow sole — a dense, compacted layer of soil just beneath the surface, which interferes with root penetration and the movement of moisture.

Profile — *see* Soil profile.

Residues system — a system of farming in which the cornstalks, grain and soybean straw, second crop of legume hay, and leguminous green manure are plowed under. No animal manure is applied.

Soil horizon — a term used for a natural structural division or layer of soil parallel to the land surface and different in appearance and characteristics from the layers above and below it; for example, the surface, subsurface, and subsoil.

Soil profile — a vertical section of soil through and including all its horizons.

Structure particles — aggregates of soil particles, such as clods, lumps, or granules.

Till — *see* Glacial till.

Topography — the lay of the land surface; as rolling topography, nearly level topography, etc.

Weathered — disintegrated and decomposed by the action of natural elements, such as air, rain, sunlight, freezing, thawing, etc.; said of soils that have been more or less strongly changed physically and chemically and leached.

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* No longer available for distribution.
** Reports 74 for Iroquois county and No. 72 for Livingston county replace Nos. 22 and 25 previously published for these two counties.

Much new information about soils has been obtained since the older soil maps and reports in the above list were printed, especially Nos. 1 to 53 issued before 1933. For many areas this newer information is necessary if the maps and other soil information in the reports are to be correctly interpreted. Help in making these interpretations can be obtained by writing Department of Agronomy, University of Illinois, Urbana.

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WHAT CROPS WILL GROW BEST ON MY FARM?

WHAT TREATMENT DOES MY SOIL NEED TO MAKE IT YIELD ITS BEST?

WHAT YIELDS CAN I EXPECT?

These are the questions this Soil Report aims to answer for the farmers and landowners of Kendall county. Careful reading will repay all who own or operate farms in this county . . . .